REPORT TO THE BOARDS OF DIRECTORS OF CRUISE LLC, GM CRUISE HOLDINGS LLC, AND GENERAL MOTORS HOLDINGS LLC REGARDING THE OCTOBER 2, 2023 ACCIDENT IN SAN FRANCISCO

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I. INTRODUCTION

A. Overview

On October 24, 2023, the California Department of Motor Vehicles (the "DMV") issued an order suspending Cruise LLC's ("Cruise" or the "Company") permit to operate driverless vehicles in California ("Suspension Order"). The Suspension Order followed a widely publicized accident in San Francisco on October 2, 2023 in which a human-driven Nissan initially collided with a pedestrian and launched her into the pathway of a Cruise autonomous vehicle ("Cruise AV" or "AV") traveling in autonomous mode in an adjacent lane. The AV then hit the pedestrian and ultimately dragged her for approximately 20 feet before coming to a final stop (the "October 2 Accident" or "Accident"). Although the Accident is considered the most severe in Cruise's history, it is Cruise's response to this Accident – and its subsequent disclosures to government regulators about the Accident – that is the subject of this Report.[1]

Specifically, Cruise held a series of meetings on October 3 to brief regulatory agencies and other government officials, and in those meetings showed a video depiction of the Accident. Following this and other meetings with Cruise employees in mid-October, the DMV issued its Suspension Order, accusing Cruise of failing to apprise the Department of certain facts about the October 2 Accident. The DMV claimed that: (i) Cruise did not disclose the AV moved forward after its initial impact with the pedestrian in what is known as a "pullover maneuver" or "secondary movement," and in the process dragged the pedestrian underneath the vehicle for approximately 20 feet; (ii) Cruise played a video for regulators depicting only a portion of the Accident but did

[1] Quinn Emanuel's clients are jointly Cruise LLC ("Cruise"), GM Cruise Holdings LLC, and General Motors Holdings LLC ("GM").

not show the pullover maneuver and pedestrian dragging; and (iii) the DMV only learned about the pullover maneuver and dragging from another government agency, impeding its oversight.

Cruise's other regulatory agencies, the National Highway Traffic Safety Administration ("NHTSA") and the California Public Utility Commission (the "CPUC"), also took action against Cruise, and similarly claim that Cruise did not affirmatively disclose the full details of the October 2 Accident, specifically the pullover maneuver and pedestrian dragging. And media outlets, which were only shown video of the Accident that stopped just prior to the Cruise AV colliding with the pedestrian (the "Media Video"), likewise have complained that Cruise never informed them of the pullover maneuver and dragging.

Cruise leadership and those who communicated with regulators acknowledge that they did not affirmatively explain the pullover maneuver and pedestrian dragging in their initial meetings with regulators and government officials following the Accident. Many meeting participants, however, have said they played the full, 45-second, 9-pane video of the Accident that showed the pullover maneuver and pedestrian being dragged (the "Full Video"). But they concede that in all of the initial meetings on October 3 except one, the video transmissions were hampered by internet connectivity issues that prevented or may have prevented regulators from seeing the entire Accident fully and clearly.

In addition, Cruise employees note that NHTSA received a copy of the Full Video within hours of their October 3 meeting, confirming Cruise's intent to disclose the pullover maneuver and pedestrian dragging to government officials. Cruise employees also state that the CPUC declined Cruise's offer to show the Full Video.

Cruise employees note that they shared the Full Video without any internet connectivity issues with the San Francisco Municipal Transportation Authority ("SF MTA"), the San Francisco

Police Department ("SFPD"), and the San Francisco Fire Department ("SFFD") on October 3, and that they had a full discussion with those agencies about the pullover maneuver and pedestrian dragging—again showing their good faith intent to disclose all facts about the Accident to regulators and government officials.

Finally, Cruise leadership concedes that it never informed the media about the pedestrian dragging or showed them the Full Video, but they believed Cruise's disclosure obligations were different for the media than for Cruise's governmental regulators.

B. Scope of Review

Quinn Emanuel was retained on October 25 to conduct an internal review to determine the facts regarding Cruise's interactions with and disclosures about the October 2 Accident to government regulators and officials. Specifically, Quinn Emanuel was asked to examine:

- Whether, as stated in the DMV Order, "[d]uring the [DMV-Cruise] meeting on October 3, 2023, Cruise failed to disclose that the AV executed a pullover maneuver that increased the risk of, and may have caused, further injury to a pedestrian";[2]
- Whether Cruise played a complete video depiction of the October 2 Accident to NHTSA regulators and/or affirmatively disclosed the pedestrian dragging;
- Cruise's interactions with the CPUC, including the allegations in its December 1, 2023 Order to Show Cause ("OSC") as to why Cruise should not be sanctioned for allegedly "failing to provide complete information to the [CPUC]" regarding the

[2] DMV Suspension Order, (Oct. 24, 2023), at 2.

October 2 Accident, and for allegedly "making misleading public comments regarding its interactions with the [CPUC]";[3] and

- Cruise's interactions with other government officials such as the SFPD, SFFD, SF MTA, California Highway Patrol ("CHP"), and other local and federal officials.
- Quinn Emanuel also reviewed Cruise's communications with the media about the details of the October 2 Accident because, in many ways, Cruise's focus on correcting erroneous media reports immediately after the Accident that the Cruise AV had caused the initial collision with the pedestrian framed its communications with the government.

Quinn Emanuel was asked to write a report summarizing its factual findings, conclusions and recommendations ("Report"). In preparing its Report and reaching its findings and conclusions, Quinn Emanuel relied upon extensive documentary evidence from Cruise, law enforcement, an engineering consulting firm, and publicly available information as well as interviews with numerous Cruise employees and contractors.

C. Review Plan Methodology and Limitations

To fulfill its remit, Quinn Emanuel established a plan for its review which included examining relevant Cruise communications and other documentary records as well as conducting interviews with Cruise employees and contractors. Cruise gave Quinn Emanuel unlimited access to all employees, documents, and other evidence. Specifically, Quinn Emanuel:

[3] Joint Assigned Commissioner's And Assigned Administrative Law Judge's Ruling Ordering Cruise LLC To Show Cause Why It Should Not Be Sanctioned By The Commission For Failing To Provide Complete Information And For Making Misleading Public Comments Regarding The October 2, 2023 Cruise Related Incident and Its Subsequent Interactions With The Commission, (Dec. 1, 2023), at 1.

- Collected and reviewed more than 205,000 documents, including e-mails, texts, Slack communications, and internal Cruise documents pertaining to Cruise AVs and the October 2 Accident in particular.
- Interviewed 88 current or former Cruise employees and contractors, several more than once.
- Reviewed a technical report by Exponent Inc., an engineering and scientific consulting firm in Menlo Park, California, which was engaged to conduct a third-party root cause analysis of the October 2 Accident.
- Provided verbal summaries during the course of its review regarding the status of the review, including recommendations, to the Boards of Cruise and GM.

As with virtually every investigative report, Quinn Emanuel's Report has certain limitations. First, this is an internal review and thus Quinn Emanuel has not interviewed government regulators and public officials who interacted with Cruise employees and who have claimed that Cruise demonstrated a lack of transparency and/or failed to disclose certain facts regarding the October 2 Accident. As a result, the findings and conclusions in this Report are based principally upon the recollections of Cruise employees and contemporaneous documents. In addition, a limited number of employees and contractors have been unavailable for interviews due to personal circumstances and/or the wide-scale Reduction in Force ("RIF") the Company implemented following the DMV Suspension Order and NHTSA recall; however, Quinn Emanuel does not view these interviews as essential to the accuracy of its Report in light of other available evidence.

Second, recollections differ and dim over time, and thus, in certain instances, Quinn Emanuel has reached findings and conclusions based upon the preponderant weight of the evidence, particularly contemporaneous documents.

Third, there were inherent technical limitations that impeded Quinn Emanuel's ability to learn certain facts. For instance, an internal forensic review could not conclusively determine

which video Cruise showed the DMV. And while Quinn Emanuel could determine which Cruise employees accessed Cruise's incident response database at any given time, it could not ascertain whether they viewed certain probative files of the Accident scene, including photos that depicted the Cruise AV had moved, dragging the pedestrian underneath.

Fourth, this Report does not address broader issues outside of Quinn Emanuel's mandate such as the safety or safety processes of Cruise AVs or its operations, which are more appropriately evaluated by those with engineering and technical safety expertise.

Finally, Quinn Emanuel's review of documents continues, which in some cases may necessitate new interviews or re-interviews of certain people. This Report is thus subject to possible supplementation or changes at some future date, depending upon what, if any, additional facts are discovered.

D. Summary of Principal Findings and Conclusions

Quinn Emanuel has reached the following principal findings and conclusions, which are discussed in detail throughout this Report:

- By the morning of October 3, Cruise leadership knew about and discussed that the Cruise AV had moved forward after the initial pedestrian impact and, in doing so, had dragged the pedestrian for approximately 20 feet. More than 100 Cruise employees – including certain members of Cruise's senior leadership, legal, government affairs, and systems integrity teams who briefed government officials – were informed of this information prior to Cruise's meetings on October 3 with the San Francisco Mayor's Office, NHTSA, DMV, and other government officials. In each of those meetings, Cruise had the intent to affirmatively disclose those material facts by playing the Full Video and letting the "video speak for itself." Because Cruise adopted that approach, it did not verbally point out these facts. This is because Cruise assumed that by playing the Full Video of the Accident for its regulators and other government officials, they would ask questions and Cruise would provide further information about the pullover maneuver and pedestrian dragging.

- The weight of the evidence establishes that Cruise played or attempted to play the Full Video depicting the pedestrian dragging in their October 3 briefings with the regulators and other government officials. However, in three of these meetings, internet connectivity issues likely precluded or hampered them from seeing the Full Video clearly and fully. And Cruise failed to augment the Full Video by affirmatively pointing out the pullover maneuver and dragging of the pedestrian.

- On October 2 and 3, Cruise leadership was fixated on correcting the inaccurate media narrative that the Cruise AV, not the Nissan, had caused the Accident. This myopic focus led Cruise to convey the information about the Nissan hit-and-run driver having caused the Accident to the media, regulators, and other government officials, but to omit other important information about the Accident. Even after obtaining the Full Video, Cruise did not correct the public narrative but continued instead to share incomplete facts and video about the Accident with the media and the public. This conduct has caused both regulators and the media to accuse Cruise of misleading them.

- The reasons for Cruise's failings in this instance are numerous: poor leadership, mistakes in judgment, lack of coordination, an "us versus them" mentality with regulators, and a fundamental misapprehension of Cruise's obligations of accountability and transparency to the government and the public. Cruise must take decisive steps to address these issues in order to restore trust and credibility.

- Despite the failure to discuss the pullover maneuver or pedestrian dragging with regulators, the evidence reviewed to date does not establish that Cruise leadership or employees sought to intentionally mislead or hide from regulators the details of the October 2 Accident. Instead, they attempted to show the Full Video of the Accident in good faith, but with varying degrees of success due to technical issues.

- Finally, the DMV Suspension Order is a direct result of a proverbial self-inflicted wound by certain senior Cruise leadership and employees who appear not to have fully appreciated how a regulated business should interact with its regulators. Regulators and other government officials who enforce laws and regulations designed to protect human health

and safety want and need to know all relevant facts about an accident involving a regulated product. It was a fundamentally flawed approach for Cruise or any other business to take the position that a video of an accident causing serious injury provides all necessary information to regulators and otherwise relieves them of the need to affirmatively and fully inform these regulators of all relevant facts. As one Cruise employee stated in a text message to another employee about this matter, our "leaders have failed us."

II. THE FACTS REGARDING THE OCTOBER 2 ACCIDENT

A. Background Regarding Cruise's Business Operations

Cruise was founded in 2013 in San Francisco, California, and develops and operates autonomous vehicles. In 2016, GM acquired Cruise. GM owns approximately 79 percent of GM Cruise Holdings LLC.[4]

Cruise's stated goal is to "responsibly deploy the world's most advanced driverless vehicle service."[5] In September 2021, Cruise began operating a driverless ride-hail service in San Francisco, deploying an all-electric fleet. In June 2022, Cruise began charging for driverless rides.[6] Cruise has explored extending its driverless fleet and ride-hail services in other metropolitan areas such as Nashville, Tennessee, Phoenix, Arizona, Austin, Texas, and also overseas, in Japan and Dubai. In September 2022, Cruise obtained regulatory permits to operate driverless ride-hail services in Phoenix and began pursuing ride-hail transportation in Austin.[7]

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[4] Notwithstanding GM's ownership interest, based upon Quinn Emanuel's review, Cruise largely operates independently of GM.

[5] Cruise Safety Report 2022, CRUISE (Nov. 21, 2022), https://assets.ctfassets.net/95kuvdv8zn1v/zKJHD7X22fNzpAJztpd5K/ac6cd2419f2665000e4eac3b7d16ad1c/Cruise_Safety_Report_2022_sm-optimized.pdf, at 8.

[6] General Motors Co., Annual Report (Form 10-K 2022) (Jan. 31. 2023).

[7] General Motors Co., Annual Report (Form 10-K 2022) (Jan. 31. 2023) ("Given the potential of all-electric self-driving vehicles to help save lives, reshape our cities and reduce emissions, the goal of Cruise is to deliver its self-driving services as soon as possible, but as Cruise continues to expand and scale its operations, safety will continue to be the gating metric, supported

Cruise's stated mission is to make transportation cleaner, safer and more accessible.[8] The October 2 Accident was the first pedestrian injury involving a Cruise AV in over five million miles of total driving.[9]

B. Key Facts Regarding the Accident

A brief summary of the Accident—considered the most severe in Cruise's history—is as follows.[10] At approximately 9:29 p.m. PT on October 2,[11] a human-driven Nissan Sentra struck a pedestrian in the crosswalk of a four-way intersection at 5th and Market Streets in downtown San Francisco. The pedestrian had entered the crosswalk against a red light and "Do Not Walk" pedestrian signal, pausing in the road in the Nissan's lane of oncoming traffic.[12] When the light

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by Cruise's Safety Management System and its other risk identification, assessment and mitigation processes.").

[8] Prashanthi Raman, *Cruise – 2022 Impact Report*, CRUISE (March 23, 2023), https://getcruise.com/news/blog/2023/cruise-2022-impact-report/.

[9] Cruise Blog Post, *A detailed review of the SF hit-and-run incident*, CRUISE (October 24, 2023), https://getcruise.com/news/blog/ 2023/a-detailed-review-of-the-recent-sf-hit-and-run-incident/.

[10] This information is derived from three sources: (i) a detailed description of the October 2 Accident is set forth in a report by Exponent, titled "Cruise AV SF Incident – Pedestrian Collision (Exponent Project 2310645.000) Technical Root Cause Analysis," (Dec. 12, 2023) ("Exponent Report"), a redacted copy, to protect confidential business information, is included as the Appendix in this Report; (ii) the San Francisco Police Department's Traffic Collision Report ("Police Report") about the Accident, (Oct. 6, 2023); and (iii) various Cruise documents discussing the Accident.

[11] Because Cruise is located in San Francisco, all subsequent time references are in Pacific Time ("PT"). Some of the documents collected and reviewed refer to "UT" or "Universal Time." For purposes of this Report, those times have been converted to PT.

[12] The Police Report cited both the Nissan driver and the injured pedestrian for vehicle code violations. The Police Report concluded that the Nissan driver was "most at fault" based on the statements provided, video evidence, and physical evidence at the scene. The Police Report cited the hit-and-run driver of the Nissan Sentra (i) for violation of CVC 21950(a), which states that drivers "shall yield the right-of-way to a pedestrian crossing the roadway," and also (ii) violation of CVC 20001(a), which states that the driver of a car in an accident resulting in injury

turned green, the Nissan proceeded through the intersection, striking the pedestrian. The force of the impact launched the pedestrian into the pathway of the Cruise AV traveling in autonomous mode without a passenger in the adjacent lane. After detecting a potential collision, the Cruise AV braked hard but was unable to avoid hitting the pedestrian. After initially coming to a complete stop, the AV then moved forward again to find a safe place to stop out of traffic in what is known as a "minimal risk condition" pullover maneuver ("pullover maneuver") or "secondary movement." Because the AV's detection system did not identify a passenger underneath its vehicle, it resumed driving at up to 7.7 mph for approximately another 20 feet, dragging the pedestrian with it, before coming to its final resting point.[13] The Nissan driver fled the scene. Emergency responders freed the pedestrian from underneath the vehicle and transported her to a local hospital for treatment. But for the human driver of the Nissan hitting the pedestrian, the October 2 Accident would not have occurred.

C. Timeline of Key Events

The timeline set forth below identifies key events and meetings relating to Cruise's interactions with its regulators, other government officials, and the media. This timeline starts on October 2 when the Accident occurred and runs through December 1, 2023, when the CPUC issued its Order to Show Cause. The timeline also includes entries showing when Cruise first became aware of the pullover maneuver and pedestrian dragging.

Date	Event
October 2, 9:29 p.m.	Accident occurs at intersection of 5th and Market in San Francisco. Driver of Nissan who initially hit the pedestrian flees

to another person "shall immediately stop the car at the scene of the accident." The Police Report further cites the pedestrian for having violated CVC 21453(d), which prohibits a pedestrian who is "facing a steady circular red or red arrow signal" from entering the road.

[13] *See* Appendix, at 16, 69, 83.

Date	Event
	the scene. Within seconds, the Cruise AV transmits a low-resolution, three-second video ("Offload 1") confirming a collision to the Cruise Remote Assistance center.
October 2, 9:32 p.m.	Cruise AV transmits a medium-resolution 14-second video ("Offload 2") of collision but not the pullover maneuver and pedestrian dragging.
October 2, 9:33 p.m.	Emergency responders arrive between 9:33 and 9:38 p.m.
October 2, 9:40 p.m.	SFFD uses heavy rescue tools to remove pedestrian from beneath the AV.
October 2, 9:49 p.m.	Cruise's Incident Response team labels the Accident a "Sev-1," which is for minor collisions. The Team also initiates a virtual "War Room" on Google Meet and a dedicated Slack channel ("War Room Slack Channel"), where approximately 20 Cruise employees convene.
October 2, 10:17 p.m.	Cruise contractors arrive at the Accident scene. One contractor takes over 100 photos and videos. He notices the pedestrian's blood and skin patches on the ground, showing that the Cruise AV moved from the initial point-of-impact to its final stopping place. Another contractor, with Cruise's authorization, gives SFPD a 14-second video showing the make, model, and license plate of the Nissan.
October 2, 11:31 p.m.	Cruise raises October 2 Accident from a "Sev-1" to a "Sev-0"—the highest level reserved for a "major vehicle incident with moderate to major injury or fatality to any party," after other Cruise employees recognize the Accident has been misclassified and raise the level. As many as 200 additional Cruise employees are paged to convene in the War Room.
October 3, 12:15 a.m.	Cruise's incident management team convenes virtual meeting within Cruise to share updates about the October 2 Accident and

Date	Event
	discuss media strategy to rebut articles that the Cruise AV had caused the Accident.
October 3, 12:45 a.m.	Cruise's government affairs team reaches out to government officials through phone calls and texts about the October 2 Accident, including the DMV, the Mayor's Office, and the CPUC. They offer briefings that day.
October 3, 12:53 a.m.	Cruise issues a press release on social media, noting that the Nissan caused the Accident. CEO Kyle Vogt and Communications VP Aaron McLear heavily edit the press statement. There is no mention in the press release of the pullover maneuver or dragging, since Cruise employees said they were not aware of those facts at the time.
October 3, 1:30 a.m.	Cruise brings its AV back to a Cruise facility to begin the process of uploading the "collision report" data from the AV, including the Full Video.
October 3, 2:14 a.m.	A 45-second video of the Accident, which depicts the pullover maneuver and pedestrian dragging is first made available, but no Cruise employees receive a notification that it is ready to be viewed until more than four hours later, when the rest of the data from the AV is processed and uploaded.
October 3, 3:21 a.m.	At the request of Cruise's government affairs, Director of Systems Integrity Matt Wood creates a 12-second video of the Accident showing the Nissan hitting the pedestrian and the pedestrian landing in front of the Cruise AV. However, the video stops before the AV hits the pedestrian.
October 3, 3:45 a.m.	After reviewing video footage and technical data from the AV, Wood posts the first known communication within Cruise of the pullover maneuver and pedestrian dragging to the War Room Slack Channel containing 77 Cruise employees at the time.

Date	Event
	Wood states that the AV had moved 1-2 car lengths after the initial collision with the pedestrian.
October 3, 6:00 a.m.	Cruise holds virtual Crisis Management Team ("CMT") meeting, where the pedestrian dragging is raised. Subsequent Slack messages at 6:17, 6:25, and 6:56 a.m. confirm discussion of pullover maneuver and pedestrian dragging.
October 3, 6:28 a.m.	After data from the AV is processed and uploaded, Cruise posts a 45-second, 9-pane video of the Accident depicting pullover maneuver and pedestrian dragging, the Full Video ("Offload 3"), on the War Room Slack Channel.
October 3, 6:45 a.m.	Cruise holds virtual Senior Leadership Team ("SLT") meeting, where Vogt and McLear discuss whether to share the Full Video with media or alter prior Cruise press statement, but decide not to do either. Subsequent 7:29 a.m. Slack message confirms that decision.
October 3, 7:25 a.m.	Cruise government affairs employee emails NHTSA official and offers to meet and provide a briefing about the October 2 Accident.
October 3, 7:45 a.m.	Cruise engineering and safety teams hold preliminary meeting to discuss and analyze collision and pullover maneuver.
October 3, 9:05 a.m.	Cruise regulatory, legal, and systems integrity employees have pre-meeting to prepare for briefing NHTSA; in their pre-meeting, they review and revise talking points and anticipated Q&As; Cruise team discusses pullover maneuver and pedestrian dragging.
October 3, 10:05 a.m.	Wood and VP of Global Government Affairs Prashanthi Raman hold a virtual meeting with the Mayor of San Francisco's Transportation Advisor. Wood shows the Full Video, reportedly with internet connectivity issues from his home computer.

Date	Event
	Neither Cruise employee raises or discusses pullover maneuver or pedestrian dragging.
October 3, 10:30 a.m.	Virtual meeting with NHTSA representatives. Wood shows Full Video, again having internet connectivity issues causing video to freeze and/or black-out in key places including after initial impact. Cruise team does not affirmatively raise or discuss pullover maneuver or pedestrian dragging.
October 3, 10:35 a.m.	Cruise engineering and safety teams hold second meeting to discuss and further analyze collision.
October 3, 11:05 a.m.	Cruise regulatory, legal, and systems integrity employees have pre-meeting to prepare to brief the DMV and California Highway Patrol ("CHP"); Cruise team does not discuss pullover maneuver and pedestrian dragging.
October 3, 11:30 a.m.	Cruise holds hybrid in-person and virtual meeting with DMV and CHP representatives. Wood shows Full Video, again having internet connectivity issues causing video to freeze and/or black-out including after initial impact. Cruise team does not discuss the pullover maneuver or pedestrian dragging.
October 3, 12:00 p.m.	At a virtual Cruise CMT meeting, Cruise engineers present their findings, including showing a detailed graphical chart plotting each movement of the Cruise AV during the Accident. The chart details how the Cruise AV braked but still collided with the pedestrian, and then moved forward again, dragging the pedestrian underneath the vehicle for approximately 20 feet before coming to a final stop.[14]

[14] The AV is programmed to move as much as 100 feet but did not do so here because the AV detected an imbalance among its wheels, which then caused the system to shut down. Specifically, a diagnostic indicated there was a failed wheel speed sensor. This was triggered because the left rear wheel was spinning on top of the pedestrian's leg. This wheel spun at a

Date	Event
October 3, 12:30 p.m.	Cruise government affairs employee calls CPUC official to discuss October 2 Accident and video.
October 3, 12:40 p.m.	Cruise holds virtual SLT meeting. Cruise engineers present same engineering findings and graphical chart to senior leadership including Vogt, COO Gil West, Chief Legal Officer Jeff Bleich, and others. Members of the safety and engineering teams raise the question of whether to ground the fleet, but Vogt and West say that fleet grounding is not warranted at this time.
October 3, 1:40 p.m.	Cruise submits Full Video to NHTSA via upload link.
October 3, 2:37 p.m.	Cruise submits 1-Day Report to NHTSA, which does not mention the pullover maneuver or pedestrian dragging.
October 3, 3:30 p.m.	Cruise holds virtual meeting with representatives from SF MTA, SFPD, and SFFD. Wood shows Full Video several times without any technical difficulties. Cruise does not discuss the pullover maneuver and pedestrian dragging but government officials see the AV move again and ask Cruise numerous questions about the pullover maneuver and the fact that the pedestrian was underneath the vehicle at the time of the maneuver.
October 3, 6:05 p.m.	Cruise holds CMT meeting. Cruise employees are informed that Vogt and West have decided to end "Sev-0 War Room" for this Accident. Certain Cruise employees later express concerns about this decision.
October 5, 10:46 a.m.	*Forbes* reporter informs Cruise that San Francisco Board Supervisor Aaron Peskin told him the AV had dragged the pedestrian and asks for a comment; Cruise declines, standing by its October 3 press release, which does not mention the pullover maneuver and dragging.

different speed than the others and triggered the diagnostic, which stopped the car long before it was programmed to stop when engaged in its search for an acceptable pullover location.

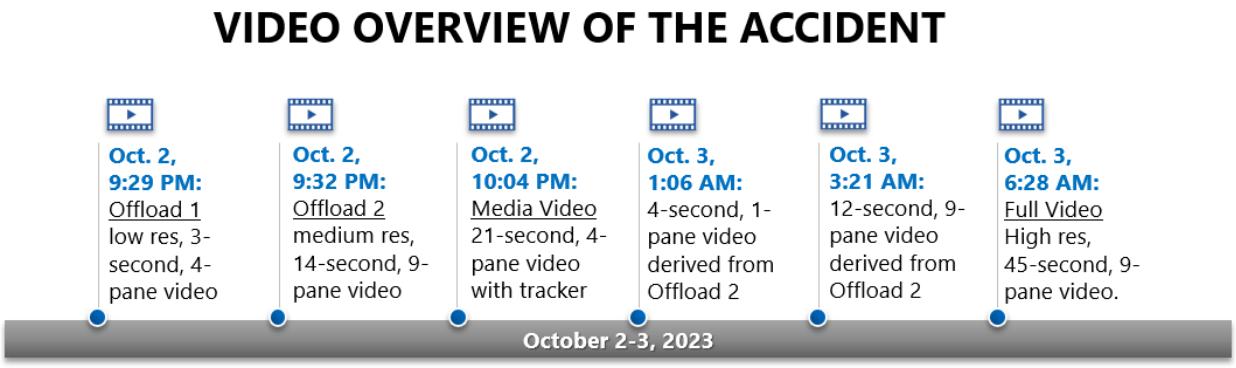
Date	Event
October 5, 1:07 p.m.	The CPUC sends a data request seeking information about the October 2 Accident, including video documentation, and sets a deadline to respond by October 19.
October 6, 10:31 a.m.	*Forbes* publishes article titled "Cruise Robotaxi Dragged Woman 20 Feet in Recent Accident, Local Politician Says."
October 10, 4:00 p.m.	DMV submits letter request to Cruise for more complete video of Accident. Cruise responds in writing that day but without providing video, offering instead to screenshare the video.
October 11, 11:00 a.m.	Cruise employees have pre-scheduled meeting with DMV representatives regarding fleet operational issues unrelated to the Accident. The DMV's request for the video of the October 2 Accident is briefly discussed.
October 11, 12:48 p.m.	Cruise paralegal submits 10-Day Report to NHTSA after checking to see if there have been any updates. Report does not mention the pullover maneuver or pedestrian dragging, as no one told the paralegal these facts needed to be added.
October 12, 3:00 p.m.	NHTSA notifies Cruise that it intends to open a Preliminary Evaluation ("PE") into the October 2 Accident and three other pedestrian-related events.
October 13, 10:00 a.m.	In response to DMV's October 10 request for video, Cruise employees meet with DMV and CHP representatives to share a 9-minute, 6-pane video of the October 2 Accident; DMV clarifies that it wants the Full Video (45-second, 9-pane video) instead.
October 13, 12:19 p.m.	Cruise uploads Full Video to DMV via upload link.
October 13, 1:30 p.m.	Cruise employees meet with NHTSA to discuss the PE and argue that this action is unwarranted.
October 16, 11:30 a.m.	Cruise employees meet with DMV and CHP representatives who state that they do not believe Cruise showed them the Full Video of the Accident during their October 3 meeting.

Date	Event
October 16	NHTSA officially opens PE into October 2 Accident and three other pedestrian-related events involving Cruise AVs. NHTSA official references lack of disclosure of pedestrian dragging.
October 18, 3:00 p.m.	Cruise employees hold standing monthly meeting with the CPUC. Cruise team says they will provide written information and video of the Accident by the CPUC's October 19 deadline.
October 19, 1:40 p.m.	Cruise provides responses to the CPUC October 5 information request and the Full Video.
October 23, 2:35 p.m.	Cruise employees learn of possible DMV Suspension of Cruise's driverless permit to operate in California.
October 24, 10:28 a.m.	DMV issues Suspension Order of Cruise's California driverless permit. Except for the few Cruise employees who learned on October 23 of the possible suspension, Cruise employees generally are taken by surprise.
October 24, 10:49 a.m.	Cruise publishes blog post about the Accident, and includes that: "Shortly after the incident, our team proactively shared information with the California Department of Motor Vehicles (DMV), California Public Utilities Commision [sic] (CPUC), and National Highway Traffic Safety Administration (NHTSA), including the full video, and have stayed in close contact with regulators to answer their questions."
November 2, 12:03 p.m.	Cruise submits 30-day NHTSA report, which includes a discussion of the pullover maneuver and pedestrian dragging.
November 2	Cruise issues recall of 950 Automated Driving Systems ("ADS") vehicles as a result of October 2 Accident.
December 1	CPUC issues Order to Show Cause why Cruise should not be sanctioned "for failing to provide complete information and for making misleading public comments regarding the October 2, 2023 Cruise related incident and its subsequent interactions with

Date	Event
	the commission." CPUC schedules a public hearing for February 6.

D. Video Footage of the Accident

There are six principal videos of the October 2 Accident. They contain varying camera views and levels of detail about the collision, and were used in different ways within Cruise and when Cruise met with government officials or engaged with the media. These videos are depicted in the timeline below:



- At 9:29 p.m., within seconds of the Accident, the AV transmitted to Cruise a low-resolution three-second video via cellular data while the AV was still on scene.[15] This is a "collision confirmation" video consisting of four camera panes. It captures only the three seconds immediately after a collision, including audio.

- At 9:32 p.m., the AV transmitted to Cruise a medium-resolution 14-second video via cellular data while the AV was still at the accident scene.[16] This is a "collision review" video consisting of nine camera panes. It was first posted on a Slack channel at 9:55 p.m. This video shows that the Nissan caused the Accident and

[15] This video is known internally as Offload 1.

[16] This video is known internally as Offload 2.

threw the pedestrian into the path of the Cruise vehicle but does not depict the post-collision pullover maneuver and pedestrian dragging. It does not have audio.

- At 10:04 p.m., Cruise produced a 21-second video of the Accident – the "Media Video." The Media Video was derived from the medium-resolution, 14-second video; however, it was played at a slower speed.

- At 1:06 a.m., Vogt cut a shorter 4-second video of the then-available 14-second video and sent it to Cruise's SVP of Government Affairs David Estrada and Chief Legal Officer Jeff Bleich stating: "this is the cut I was thinking of." Estrada responded: "yes, agree that should be the primary video that gets released if one is released." This video showed an isolated, single-pane view from the left front camera on the AV and captured only the moment that the Nissan hit the pedestrian. Ultimately, this edited video was not shown. At 1:22 a.m., Estrada advocated that this version of the video be shown in regulator meetings first to show "what happened in clarity so you can see how the event happened (establish clear fault of human driver)," followed by the "zoomed out full scene." However, there is no evidence this shorter 4-second video was shown at any of the regulatory meetings.

- At 1:12 a.m., Cruise's VP of Global Government Affairs Prashanthi Raman, after conferring with Estrada, asked Wood to cut a shorter version of the then-available 14-second video. Raman stated: "given last night's Sev 0 and our need to discuss with policymakers, can you please make us a usable video of this angle [link to Webviz]. We only need to show the impact and the person landing in front of us and then cut it there." At **3:21 a.m.**, Wood created the requested video, which was 12 seconds in length. The balance of the evidence, however, establishes that Cruise employees did not show this video to regulators in any of their meetings. Cruise's Senior Director of Federal Affairs Eric Danko told Wood at 5:58 a.m.: "I believe NHTSA will want video footage that captures moment of our impact as well." Wood responded: "I can create a NHTSA version video once the logs have been offloaded."

- At 1:30 a.m., Cruise brought the AV back to a Cruise facility to begin the process of offloading the collision data (or logs) from the vehicle and transmitting it wirelessly.[17] Because this was a collision, the "Full Video" from the car, or "collision report," was automatically marked high priority and processed at an expedited speed as compared with the rest of the data from the AV. While the Full Video first became available at 2:14 a.m., Quinn Emanuel learned that no Cruise employee was notified when the Full Video was ready for viewing and instead was only notified when all of the data from the AV was processed and uploaded. Only at **6:28 a.m.**, after the full data from the AV had been processed and uploaded, did Cruise employees receive notification. At that point, a link to the Full Video – a 45-second, nine-camera video from the AV – was posted in the War Room Slack Channel.[18] The Full Video depicted the pullover maneuver and pedestrian dragging in the fourth left camera pane. This video does not have audio.

E. The Facts Regarding What Cruise Knew and When About the October 2 Accident

1. Facts Cruise Learned the Evening of October 2

a. Accident Scene

Within 10-15 minutes of the October 2 Accident, Cruise's Driverless Support Specialists ("DSS") arrived at the accident scene. Another two-person DSS team arrived between 10-10:30 p.m., along with a member of Cruise's operations team and a member of Cruise's Safety Escalation

[17] Cruise could not begin the lengthy process of acquiring the data from the vehicle until law enforcement permitted Cruise to bring the AV back to Cruise facilities in San Francisco. Cruise gave law enforcement who followed the AV back to Cruise facilities a copy of the 14-second video in exchange for permitting Cruise to remove the vehicle from the accident scene, rather than impounding it.

[18] This video is known internally as Offload 3.

Team ("SET"). At least one of these on-site contractors, who took over 100 photos and videos at the scene, said he had some understanding of the pedestrian dragging.[19]

That contractor reported he saw blood and pieces of skin in one spot that was two to three car lengths from where the AV finally stopped. The contractor also took some long shots of the vehicle's path that showed a trail of blood on the street and depicted the distance the AV traveled after the initial impact. The contractor was instructed to bring his company-provided phone to Cruise facilities, rather than upload the video onto the customary Slack channel, which he believes was in order to protect the injured pedestrian's privacy.

The photos and videos were then uploaded by 2:23 a.m. onto Cruise's "RINO"[20] database, a landing page created to store information, including photos and videos for every incident. More than 100 Cruise employees, including those from legal, government affairs, and incident management, accessed the RINO database starting at 5:11 a.m. on October 3 and continuing throughout the day and thereafter. However, Quinn Emanuel was told that the database cannot show which Cruise employees, if any, reviewed the specific photos and videos. None of the Cruise employees Quinn Emanuel interviewed indicated they understood on the night of October 2 that

[19] Another Cruise employee at the accident scene denied knowing that the Cruise AV had pulled forward, dragging the pedestrian. On October 10 and 12, as part of its own internal retrospective review of the Accident before Quinn Emanuel was retained, a Cruise employee interviewed members of Cruise's Remote Assistance team in Arizona, which receives the initial report of any accidents and monitors them remotely. According to the Cruise interviewer's contemporaneous notes, one Remote Assistance operator saw "ped flung onto hood of AV. You could see and hear the bumps," and another saw the AV "was already pulling over to the side." Quinn Emanuel did not learn of these individuals until after the Company-wide Reduction in Force on December 14. One declined an interview and the other did not respond. Two other interviewees reported some discussion of the fact that the AV had moved or engaged in a secondary movement on either the evening of October 2 or the early morning hours of October 3. However, this information has not been verified and appears contrary to the weight of the evidence.

[20] "RINO" is the acronym for Road Incident Notes and Outcomes.

the pedestrian had been dragged underneath the vehicle and/or communicated such information to any other Cruise employees.[21]

b. Virtual "Sev-0 War Room"

Many Cruise employees work remotely around the country, visiting Cruise's main facility in San Francisco a few times a month. Thus, when the October 2 Accident occurred, Cruise's Incident Response team activated a nationwide emergency pager alert system to notify Cruise employees, wherever located, within 20 minutes of the October 2 Accident. Cruise's Response team also set up a Google Meet as well as a dedicated incident response Slack Channel referred to as the virtual "War Room."[22] Initially, there were approximately 20 people in the War Room, but when the Accident was elevated from a Sev-1 to a Sev-0 by 11:30 p.m., up to 200 more employees were paged.[23] Over the course of the evening of October 2 and throughout the day on October 3, over 200 employees joined and left the War Room.

Vogt joined the War Room Slack Channel at 11:55 p.m. and the Google Meet by midnight. Other senior Cruise employees also joined, including Chief Legal Officer Jeff Bleich, COO Gil West, Senior Vice President of Government Affairs David Estrada, VP of Global Government

[21] Two interviewees stated that they recalled a discussion about the pedestrian being dragged while in the Sev-0 War Room on Google Meet. Both interviewees joined the Sev-0 War Room intermittently and could not identify who in particular was involved in the discussion. The two interviewees also could not recall the timing of the discussion other than one stating it would have been before 4:00 a.m. when his shift ended.

[22] The official name of the War Room Slack Channel is "#acp-im-9875-road-incident."

[23] There is an incident response playbook that Cruise is supposed to follow for Sev-0 events, which outlines the roles of the Incident Commander, SLT, CMT, and others in such a situation as well as the response approach by phases, including (i) identification and mobilization for an incident; (ii) stabilizing the scene; (iii) assessing issues and next steps; and (iv) the recovery phase, outlining what to do in the weeks after an incident. At least one interviewee said this playbook was not followed for the October 2 Accident and that it was "aborted" because it was "too manually intensive." Other facts appear to support this view.

Affairs Prashanthi Raman, and other vice presidents as well as employees from legal, government affairs, communications, engineering, safety, and other divisions.

Aside from the videos and photos the contractor took at the accident scene,[24] Quinn Emanuel is not aware of any conclusive evidence indicating that any Cruise employee, including those in senior leadership, had knowledge on the night of October 2 that the Cruise AV had engaged in a pullover maneuver that had resulted in dragging the pedestrian underneath the vehicle for approximately 20 feet.

c. Initial Media Narrative About the October 2 Accident

Although the War Room was supposed to address a variety of issues such as understanding how the accident happened and next steps, the focus quickly centered almost exclusively on correcting a false media narrative that the Cruise AV had caused the Accident. The initial media articles inaccurately blamed the Cruise AV for causing the accident and hitting the pedestrian, making no mention of the Nissan hit-and-run-driver who initially hit the pedestrian.

[24] Quinn Emanuel was unable to interview four other on-scene contractors. Some interviewees chose not to speak with Quinn Emanuel after they were laid off when Cruise eliminated their positions; others did not respond to requests for an interview.

Figure 1: October 2-3 Media Coverage

The perception that Cruise was solely at fault was fueled in part by statements from the San Francisco Fire Department that failed to mention the hit-and-run driver in its news release, stating only that: "At 9:31 pm 911 dispatchers were alerted to a possible motor vehicle versus pedestrian at the intersection of 5th and Market Streets in San Francisco. Rescuers arrived to find an adult female pinned beneath an autonomous vehicle suffering multiple traumatic injuries."

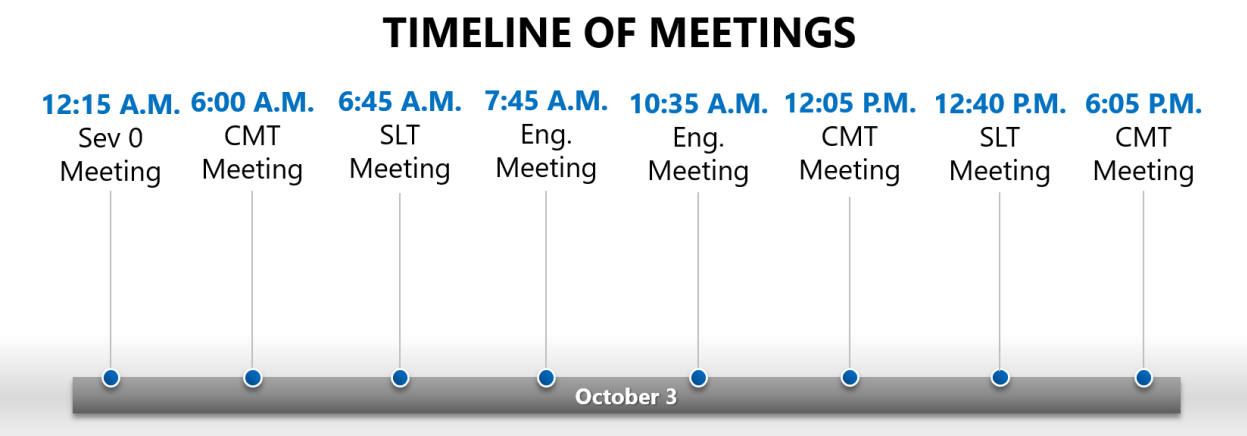
In light of an increasing barrage of negative press at a time when Cruise was seeking to expand in San Francisco, certain senior Cruise executives focused on rebutting the erroneous media narrative, using words like they were "under siege," and "we have no fighting chance with these headlines/media stories…we are drowning."

Because Cruise had the 14-second video within minutes of the Accident, Cruise knew that the media articles were inaccurate; the video showed clearly that another vehicle, the Nissan, had hit the pedestrian and fled the scene. Armed with this 14-second video, members of Cruise's senior leadership became laser focused on correcting the erroneous news stories and social media narrative. Cruise quickly decided to show the 14-second video to the San Francisco Police

Department and then a 21-second version of it at a slower speed, the "Media Video," individually to media outlets in remote share-screen sessions.

2. Facts Cruise Learned on October 3

In the early morning hours of October 3, while the War Room continued to meet, Cruise had a series of discrete internal meetings that are important for pinpointing which Cruise employees, including those in senior leadership, learned of the pullover maneuver and pedestrian dragging, and when. This timeline is a core focus of the Report and is depicted below.



a. The 12:15 a.m. "Sev-0 Collision SFO" Meeting

The CMT Incident Management Manager convened a virtual meeting at 12:15 a.m. titled "Sev-0 Collision SFO" with more than 140 invitees. The focus of the meeting was on sharing updates about the October 2 Accident and discussing the strategy for rebutting the erroneous media narrative that the Cruise AV had caused the October 2 Accident.

As a Slack communication shows, Cruise employees viewed the risk that the public would believe the Cruise AV injured the pedestrian as a burgeoning crisis. At 11:50 p.m., the SVP of Government Affairs, Estrada, wrote to his VP of Global Government Affairs, Raman, that it "feels like we are fighting with both arms tied behind our back if we are so afraid of releasing an exonerating video, very naïve if we think we won't get walloped by media and enemies." In

response, Raman captured well the feeling within Cruise's senior leadership, stating: "we are under siege is my opinion, we have no fighting chance with these headlines/media stories…we are drowning — and we will lose every time." In fact, the October 2 Accident was the "highest spike in coverage for any incident" Cruise had ever had, according to an analysis Cruise did in the aftermath of the event, resulting in 165 pieces of press coverage and more than 2,500 social media mentions.

According to interviewees, Vogt attended this meeting and decided what portion of the 14-second video—the longest video then available—should be shown to the media, selecting specific camera angles to be included. Interviewees recount that Vogt wanted to reveal only the 4-second portion of the Accident demonstrating that the Nissan, not the Cruise AV, initially hit the pedestrian in order to avoid showing the pedestrian's "traumatic" and "disturbing" injuries. Vogt also is said to have expressed to Cruise meeting attendees that he personally wanted to see and authorize the final cut of any video or media statement and that "nothing would be shared or done" regarding the media without his sign off.[25]

As this meeting was ongoing, Cruise communications members were in the process of drafting their official comment for attribution and "on background" statements to deliver to the press. At 12:16 a.m., these members drafted a set of bullet points to share on background with reporters, including that "[t]he AV came to a complete stop immediately after impacting the struck pedestrian." While this statement is not accurate given the AV's subsequent pullover maneuver

[25] Given the number of meetings, this interviewee could not recall whether Vogt made these statements during the 12:15 a.m. or 6:45 a.m. meeting but was certain as to the communication itself. Contemporaneous documents and the timing of the sharing of the video and press statement with the media suggest that the comments were most likely made in the 12:15 a.m. meeting.

before coming to a final stop, at the time of initial drafting, the communications team was unaware of this inaccuracy.

Vogt and McLear, along with the communications team, were involved in the drafting of the press release posted at 12:53 a.m. The press release said nothing about the pullover maneuver or pedestrian dragging because they were unaware of it at the time.

b. Engineer's 3:45 a.m. Slack Message

The first Company-wide dissemination of information that the Cruise AV had engaged in a pullover maneuver dragging the pedestrian underneath the vehicle came in the early morning hours of October 3. Specifically, at 3:45 a.m.,[26] Director of Systems Integrity Wood posted on the War Room Slack Channel the following message:

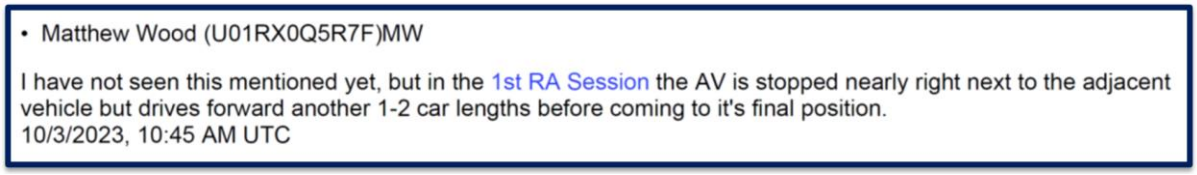


Figure 2: October 3 Slack message posted by Wood to "War Room Slack Channel" at 3:45 a.m.

In response, one Cruise employee wrote: "ACP, I can't access the link but is the PED under the vehicle while it continues to move? Am I understanding that correctly?" Wood responds: "I believe so and the AV video can be seen moving vertically."

Wood reached this conclusion by accessing technical data from Cruise's Remote Assistance center in Arizona. Within seconds of a collision, the AV generates a computerized video recording which is viewed by a member of the Remote Assistance team and depicts the direction and trajectory of the vehicle as well as other technical data. From this data, Wood deduced the AV may have moved one to two car lengths, with the pedestrian trapped underneath.

[26] Cruise Slack messages are collected in UTC, which at this time was seven hours ahead of PST.

There were 77 Cruise employees in the Slack channel at the time Wood posted his message. Quinn Emanuel has not identified any other Cruise employee who accessed this data prior to or contemporaneous with Wood.

c. The 6:00 a.m. Crisis Management Team (CMT) Meeting

After Wood posted his Slack message, the CMT discussed the pullover maneuver and dragging at its 6:00 a.m. meeting, according to both contemporaneous documents and interviewees. More than 100 people attended this meeting, including Cruise's COO Gil West, co-founder and Chief Product Officer Dan Kan, the VP of Communications, the Senior Director of Federal Affairs, and members of the communications, legal, engineering, safety, regulatory, and government affairs teams.

At 6:17 a.m., while the CMT call was ongoing, a Cruise engineer sent a direct message to Wood to ensure the pullover maneuver would be discussed. He asked: "have they raised the issue that the AV moved post-event? On this call. I joined late." Wood responded: "Not yet. I will raise."

Interviewees and contemporaneously posted communications confirm that the AV's "pulling" of the pedestrian for one to two car lengths was discussed. At 6:25 a.m., while the

meeting was ongoing, COO West wrote in a direct message to six other senior leaders, including Vogt:

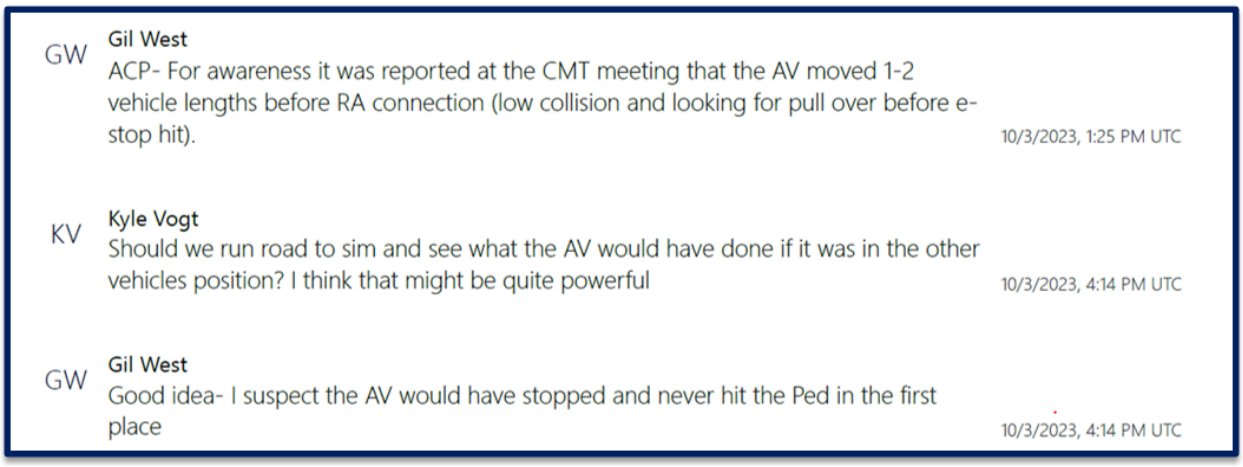


Figure 3: October 3 Slack message from COO West to six other senior leaders at 6:25 a.m.

Subsequently, at 6:56 a.m., an engineer provided a summary of the CMT discussion in the War Room Slack Channel:

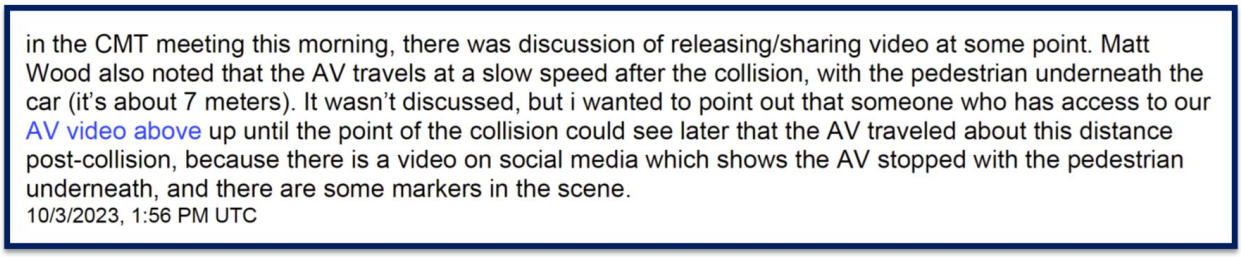


Figure 4: October 3 Slack message posted by engineer to "War Room Slack Channel" at 6:56 a.m.

This is yet additional evidence that by the end of the 6 a.m. CMT meeting, some Cruise employees, including certain senior leaders, had been informed that the AV had moved forward after the initial impact, dragging the pedestrian underneath the vehicle for approximately 20 feet.[27]

[27] In his message, that same engineer also flagged that non-engineers could deduce the pedestrian had been dragged if they had access to video before the AV made impact with the pedestrian and compared that with social media video posted online depicting where the AV came to a final stop. Since the social media video depicted markers at the Accident scene, a non-engineer could deduce that the AV had moved forward with the pedestrian also underneath. This same engineer, after the DMV Suspension Order came out, told another Cruise employee in a Slack

d. The 6:45 a.m. Senior Leadership Team (SLT) Meeting

Cruise's knowledge that the October 2 Accident extended to dragging a pedestrian underneath the AV had significant implications for Cruise's media strategy which, until that point, had focused exclusively on correcting the record that the Cruise AV had caused the Accident.

Documentary evidence and accounts from meeting participants confirm that Cruise senior leadership discussed the pedestrian dragging. One interviewee who attended the SLT meeting recalled discussing that the AV had dragged the pedestrian, saying the "SLT was aware." Another interviewee reported that "there was a whole discussion about the facts. We knew the vehicle came to a stop, then accelerated again."

As a result of this new information, Vogt, Communications VP McLear, and other employees discussed whether to amend Cruise's initial media communications, including its social media statement, to disclose the pullover maneuver and pedestrian dragging. According to one interviewee, "the outcome [of these discussions] was whatever statement was published on social we would stick with because the decision was we would lose credibility by editing a previously agreed upon statement."

Slack communications also show McLear believed that while the Full Video would be shown to regulators, the pedestrian dragging was not material to Cruise's efforts to show the media

message: "I pointed out in the channel that it was not hard to conclude there was movement after the initial stop…it seems the DMV fully understanding the entire details was predictable."

that the Nissan vehicle initially hit the pedestrian, causing the October 2 Accident. As stated in McLear's 7:08 a.m. Slack, after sending a hyperlinked video to potentially share with the public:

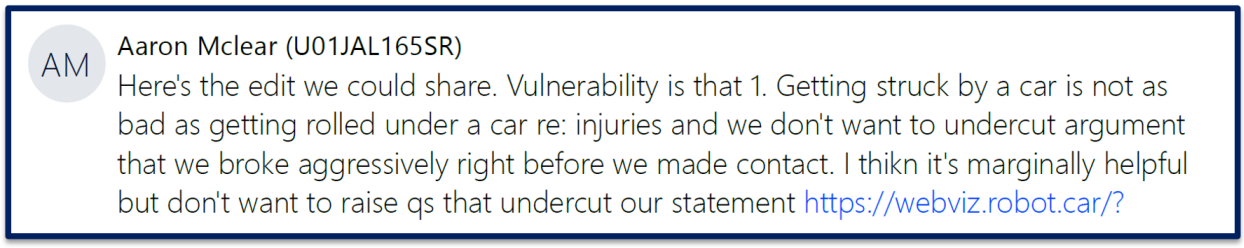


Figure 5: October 3 Slack message from McLear to other communications employees at 7:08 a.m.

Seeking to avoid triggering another news cycle, McLear recommended against updating the media about the full details of the October 2 Accident, opting instead to maintain Cruise's focus on correcting the false media reports at the time. As McLear later explained in a Slack message: "[W]e did share all the info with all of our regulators and the investigators. We have no obligation to share anything with the press."

The SLT elected not to show the Full Video to the media or change Cruise's original social media message, which did not include any discussion of the pullover maneuver and pedestrian dragging. In a dedicated Slack channel to discuss media communications that day, a Communications team member told McLear: "reporters are asking why we can't share the full video file with them…" McLear responded and confirmed in a 7:29 a.m. Slack message the SLT's decision:

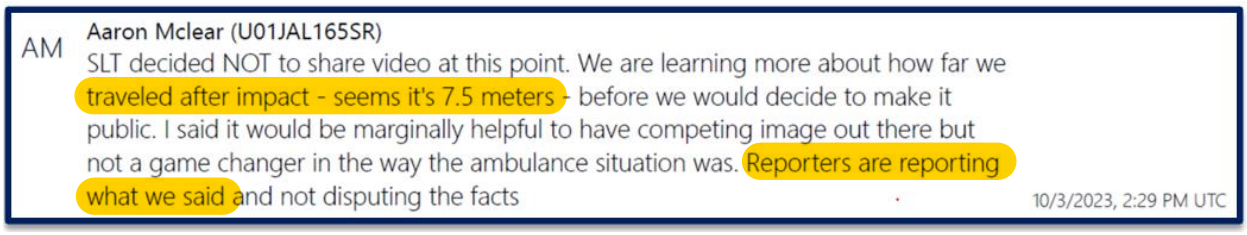


Figure 6: October 3 Slack message posted by McLear to Slack channel with more than 50 Cruise employees from communications, legal, and government affairs at 7:29 a.m.

Replying to this message, another Cruise communications member said that Cruise will continue to "rely on the original webviz for screen sharing." The word "webviz" in his message was hyperlinked to the 21-second Media Video, which did not show the pullover maneuver and pedestrian dragging.

A message between two Cruise employees, one of whom attended the 6:45 a.m. SLT meeting, confirmed that the SLT "agreed to not share anything just yet . . . seems like SLT leaning towards not sharing unless we're backed into a corner." In light of this decision, the Cruise communications team continued to screen-share the Media Video well into the afternoon of October 3 with such media outlets as CBS News, SFGate, KRON4, KPIX, and *Crain's Business*, despite knowing that the video stopped at the point of impact and omitted key details of the Accident.

Communications members also continued to give reporters the following bullet point on background: "[t]he AV came to a complete stop immediately after impacting the struck pedestrian," even though by this time Cruise, including senior members of its communications team, knew that the AV moved forward immediately after striking the pedestrian. Cruise communications team members gave this statement to media reporters after the 6:45 a.m. SLT meeting, some of whom published it, well into the afternoon of October 3, including *Forbes*, CNBC, ABC News Digital, Engadget, Jalopnik, and *The Register*.[28] For example, CNBC[29]

[28] It was not until October 13, when a communications employee was planning on giving the same set of pre-drafted "on background" bullet points to a reporter that Cruise ultimately deleted this "complete stop" sentence from their communications plan. A communications employee flagged it for legal, and a lawyer responded: "I don't think we can say this." Wood agreed that he "[w]ould not recommend stating this given the sensitivity."

[29] Rohan Goswami, *San Francisco woman trapped under autonomous Cruise vehicle after being struck in hit and run*, CNBC (Oct. 3, 2023, 9:40 AM PT, updated Oct. 3, 2023, 4:26 PM PT), https://www.cnbc.com/2023/10/03/driverless-cruise-car-traps-woman-after-hit-and-run-incident.html.

reported at 8:51 a.m.: "The Cruise vehicle immediately came to a stop after the woman was thrown into it"; ABC News[30] Digital reported at 9:48 a.m.: "The autonomous vehicle came to a complete stop after striking the pedestrian, Cruise said"; and Engadget[31] reported at 10:14 a.m.: "As the autonomous taxi proceeded through the green light, it ran over her and came to a complete stop, pinning her leg under its rear axle and tire."

e. The 7:45 a.m. and 10:35 a.m. Engineering and Safety Team Meetings

After the morning CMT and SLT meetings, the engineering and safety teams broke into separate groups to address specific tasks. They attempted to determine what happened after the AV came to a full stop. The engineering and safety teams then reconvened at 7:45 and 10:35 a.m., to discuss their engineering analysis.

[30] Meredith Deliso, *Woman gets pinned under driverless car after being hit by other vehicle*, ABC NEWS (Oct. 3, 2023, 10:24 AM PT), https://abcnews.go.com/US/woman-gets-pinned-driverless-car-after-hit-vehicle/story?id=103690558#:~:text=Theautonomousvehiclecameto,ofpolicthecompanysaid.

[31] Will Shanklin, *A pedestrian was pinned under a Cruise robotaxi after another car's hit-and-run*, engadget (Oct. 3, 2023), https://www.engadget.com/a-pedestrian-was-pinned-under-a-cruise-robotaxi-after-another-cars-hit-and-run-180404816.html#:~:text=Awitnessallegedlytoldinvestigators,itsrearaxleandtire.

f. The 12:05 p.m. CMT Meeting

Shortly after noon, Cruise had a second CMT meeting with more than 100 invitees. The engineering and safety teams provided a comprehensive, in-depth review of their analysis, including the detailed graphical chart of the post-collision pullover maneuver, pictured below:

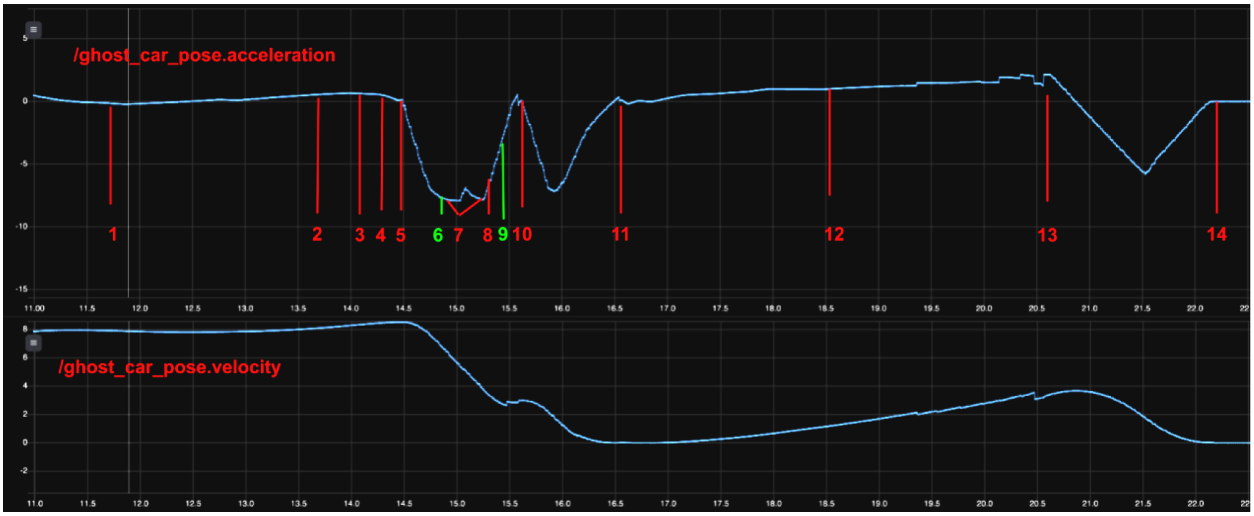


Figure 7: Overview graph of AV's movements created by Engineering team as part of Engineering Analysis into Accident, and presented at the 12:05 and 12:40 p.m. CMT and SLT meetings.

The chart plot points depict that between events 11 and 14, the AV moved after the initial collision impact before coming to its final resting stop.

g. The 12:40 p.m. SLT Meeting

At the 12:40 p.m. SLT meeting, the same members of the engineering and safety teams showed the identical graphical chart discussed at the CMT meeting. They informed the SLT their analysis concluded that the AV had moved forward, dragging the pedestrian. Vogt is said to have stated that it was good the AV stopped after 20 feet when it detected interference with its tire rather than continuing, as AVs are programmed to do, to look for a safe place to pull over for up to 100 feet or one full block.

The safety and engineering teams also raised the question whether the fleet should be grounded until a "hot fix"—a targeted and rapid engineering solution—could be developed to

address how to improve the ability of Cruise AVs to detect pedestrians outside its nearfield[32] and/or underneath the vehicle. Vogt and West decided that the data was insufficient to justify such a shutdown in light of the overall driving and safety records of Cruise AVs. Vogt reportedly characterized the October 2 Accident as an extremely rare event, which he labeled an "edge case."

h. The 6:05 p.m. CMT Meeting

At 6:05 p.m., there was an end-of-day meeting with a small group of CMT employees where some teams summarized the workstreams they were tasked with related to the Accident. CMT leaders learned the SLT had decided to disband the Sev-0 War Room. Quinn Emanuel has found no evidence of anyone raising or discussing in this end-of-day meeting whether the regulators were told about the pullover maneuver and pedestrian dragging.

Some interviewees said they later expressed concern that there were no further scheduled CMT meetings for the biggest accident Cruise had faced in its history. Some Cruise employees suggested to Chief Legal Officer Jeff Bleich and others that they create a "miniature CMT" where a smaller team would meet regularly for a continued update on any new topics related to the Accident from at least communications, engineering, and regulatory perspectives. While Bleich and others were supportive of the idea, it was never implemented, and thus, the last CMT regarding the Accident was on the evening of October 3.

3. Cruise's Response to the *Forbes* Article

On October 5, Cruise received a media inquiry from a reporter at *Forbes* magazine stating that President of the San Francisco Board of Supervisors Aaron Peskin had told him the pedestrian had been dragged 20 feet in the Accident and that Cruise did not disclose it publicly. The *Forbes* reporter reached out to Cruise requesting a comment for his article.

[32] "Nearfield" is an area that is very close to the vehicle.

In an October 5 email exchange, the *Forbes* reporter told two Cruise communications members: "Yesterday, I spoke to SF Sup. Aaron Peskin who told me that his understanding is that the victim here was 'dragged an additional 20 or more feet [by the Cruise AV], resulting in more grievous injuries to the victim.'" The *Forbes* reporter asked to "view the video" in person so that he could see whether the victim was dragged "per Peskin's allegation" or whether "the AV came to a complete stop immediately after impacting the struck pedestrian," as Cruise stated in the "On background" statements it provided to the media on October 2 and 3.

Cruise discussed internally whether to update its messaging and respond to the *Forbes* reporter, ultimately opting not to respond. Cruise again decided not to offer details that it believed would trigger a new media cycle and, instead, updated its messaging to state it was no longer sharing video with the media and that Cruise did not have more to add beyond its original statement. McLear's position, as discussed above, was that as contrasted with the regulators, Cruise has "no obligation to share anything with the press."

The *Forbes* article ran on October 6, reporting that "Cruise Robotaxi Dragged Woman 20 feet In Recent Accident, Local Politician Says."

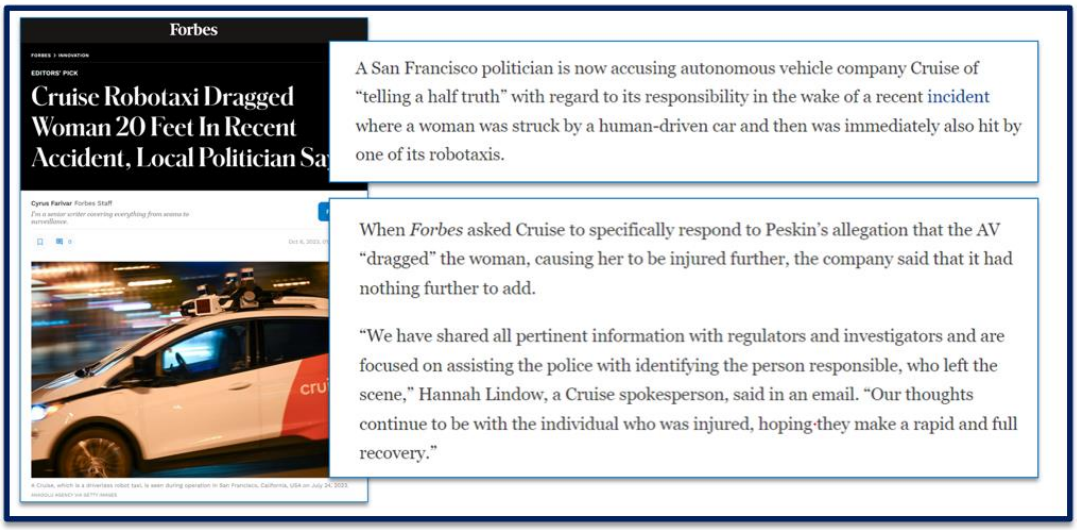


Figure 8: Excerpts from October 6 Forbes Article.

The article appears to be the first public report that the Cruise AV had dragged the pedestrian.

III. CRUISE'S COMMUNICATIONS WITH REGULATORS, CITY OFFICIALS, AND OTHER STAKEHOLDERS

A. Overview of Cruise's Initial Outreach and Meetings with Regulators

Starting approximately three hours after the October 2 Accident, Cruise began contacting various government officials, including its regulatory bodies, to notify them about the October 2 Accident. This outreach included the DMV, the Mayor's Office, NHTSA, CPUC, the SF MTA, SFPD, and SFFD, as well as Congressional staffers. The government affairs team drafted an "initial blurb" by 12:24 a.m. that discussed the details then known about the Accident. Because Cruise employees were not yet aware of the pullover maneuver and pedestrian dragging, the statement concluded with the initial collision between the AV and the pedestrian.

B. The Mayor's Office Meeting on October 3

A Cruise government affairs employee reached out to the Mayor's Office early on October 3, around 12:45 a.m., to notify the Mayor's Transportation Advisor Alexandra Sweet of the Accident and offered to provide a briefing. A meeting was set up, and several hours later at 9:05 a.m., the VP of Global Government Affairs Raman and Director of Systems Integrity Wood screen-shared the Full Video with the Mayor's Transportation Advisor on video conference. According to Raman, the video was played twice but there were internet connectivity issues. Raman also said that she was unaware at the time that the pedestrian had been dragged and did not notice it on the Full Video. Neither Raman nor Wood recalled any discussion regarding the AV's movement or dragging and Wood did not affirmatively raise it.

Instead, in what would become a standard approach in Cruise's subsequent meetings with government officials on October 3, a Cruise employee provided a general overview of the October

2 Accident, Wood played the Full Video, and then the Cruise employees waited to respond to questions. Both Raman and Wood recalled that Sweet had a visible reaction to seeing the Nissan hit the pedestrian. According to Raman, Sweet noticed that the car moved again, but asked no questions about the pedestrian dragging.[33] The Mayor's Office did not request additional information about the Accident following the meeting.

C. Cruise's Disclosures to the National Highway Traffic Safety Administration (NHTSA)

1. Cruise's Initial Outreach on October 3

At 7:25 a.m., Cruise's Head of Regulatory Engagement emailed a NHTSA official offering to have Cruise employees brief NHTSA about the Accident. The email informed the NHTSA official that Cruise planned to file a "1-Day" NHTSA report on the Accident, as required by NHTSA's Standing General Order on Crash Reporting ("SGO").[34] NHTSA responded in an email with the issues it would like addressed: "Cruise vehicle control dynamics (lateral and longitudinal) leading to the incident and following impact including ADS predicted path of the pedestrian and whether any crash avoidance or mitigation took place," and "Whether the Cruise ADS or remote assistant could ascertain that the pedestrian was trapped under the vehicle or the location of a pedestrian on the ground." NHTSA also requested a video of the Accident but did not send the

[33] Raman, too, said she first noticed that the car moved again when watching the video with the Mayor's Transportation Advisor. She did not subsequently ask Wood or others why the AV moved again or about whether the pedestrian had been dragged, explaining: "we had another call after that [Mayor's meeting] then DMV so [she] didn't make that inquiry at that time." Neither Wood nor anyone on the government affairs team ensured that she was briefed about the full facts prior to the meeting.

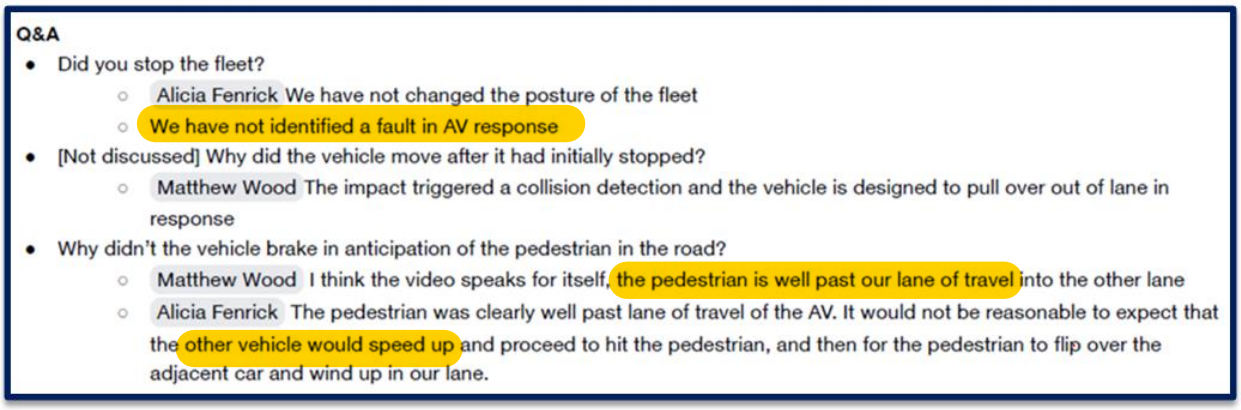
[34] SGO stands for "Standing General Order." In 2021, NHTSA issued a Standing General Order "requiring identified manufacturers and operators to report to the agency certain crashes involving vehicles equipped with automated driving systems." https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting.

link to upload the video until 10:59 a.m., when the virtual meeting between Cruise and NHTSA was ending.

Cruise's CLO Bleich also emailed NHTSA's Acting Administrator and other senior officials, informing them of the meeting and apprising them of the October 2 Accident.

2. Cruise's NHTSA Pre-Meeting

Six Cruise employees from government affairs and systems integrity held a meeting at 9:05 a.m. to prepare for their NHTSA meeting. As part of their preparation, the team discussed and edited a Google document labeled "Running Talking Points and Notes." This document included a "Q&A" section addressing three questions they anticipated NHTSA might raise and Cruise's anticipated responses, including who would give them:


Q&A

- Did you stop the fleet?
  - Alicia Fenrick We have not changed the posture of the fleet
  - We have not identified a fault in AV response
- [Not discussed] Why did the vehicle move after it had initially stopped?
  - Matthew Wood The impact triggered a collision detection and the vehicle is designed to pull over out of lane in response
- Why didn't the vehicle brake in anticipation of the pedestrian in the road?
  - Matthew Wood I think the video speaks for itself, the pedestrian is well past our lane of travel into the other lane
  - Alicia Fenrick The pedestrian was clearly well past lane of travel of the AV. It would not be reasonable to expect that the other vehicle would speed up and proceed to hit the pedestrian, and then for the pedestrian to flip over the adjacent car and wind up in our lane.

Figure 9: Questions and Answers Cruise NHTSA team prepared ahead of October 3 meeting with NHTSA in a Running Talking Points and Notes document.

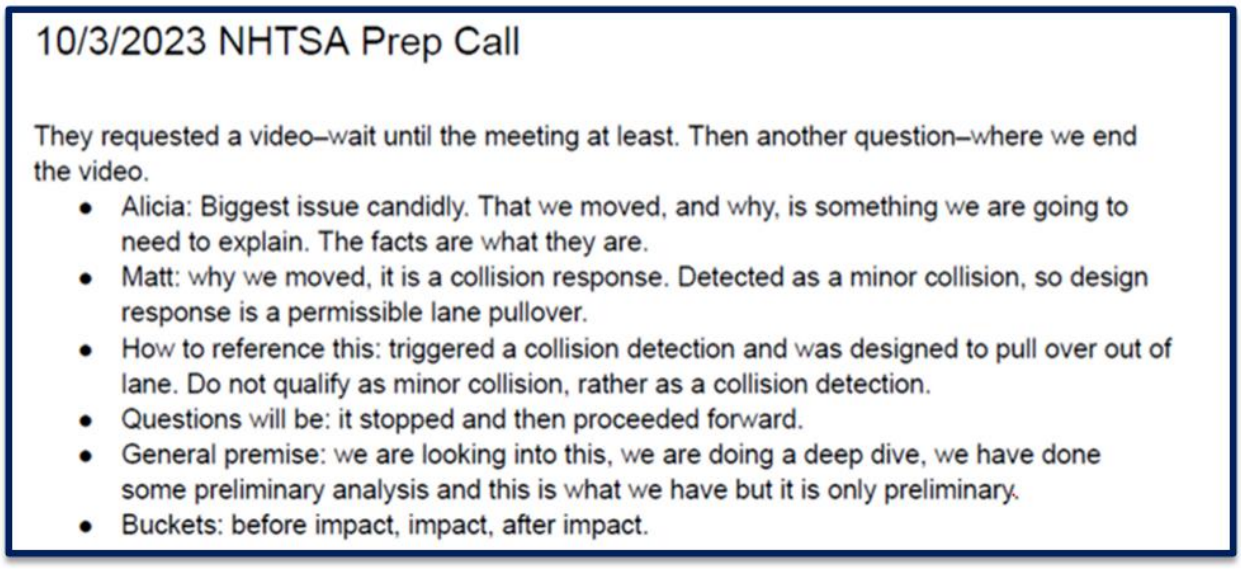
Wood's prepared answer to the third question rested on a common theme interviewees relayed, that "the video speaks for itself," meaning that Cruise employees planned to show the Full Video during the meeting with regulators and then wait to respond to their questions.

The first question in the prepared Talking Points also posited having Vice President and Deputy General Counsel Alicia Fenrick state: "[w]e have not identified a fault in AV response,"

even though the Cruise AV had moved forward in a pullover maneuver with the pedestrian trapped underneath it.

In addition to the shared "Running Talking Points and Notes" document, a Cruise employee took contemporaneous notes during the Cruise pre-meeting. In relevant part, those pre-meeting notes state: "They requested a video – wait until the meeting at least. Then another question – where we end the video." As reflected in these notes, the team discussed when to send the video to NHTSA, and what video to send. Specifically, the team discussed whether to show the 14-second video or the Full Video. Contemporaneous Slack messages between the Cruise NHTSA team show they decided to play the Full Video so that the complete accident would be displayed as they did not want to "be accused of hiding the ball" from NHTSA.

The Cruise employee's notes also provide more detail regarding the anticipated question about the pedestrian dragging and how to address it.



10/3/2023 NHTSA Prep Call

They requested a video–wait until the meeting at least. Then another question–where we end the video.

- Alicia: Biggest issue candidly. That we moved, and why, is something we are going to need to explain. The facts are what they are.
- Matt: why we moved, it is a collision response. Detected as a minor collision, so design response is a permissible lane pullover.
- How to reference this: triggered a collision detection and was designed to pull over out of lane. Do not qualify as minor collision, rather as a collision detection.
- Questions will be: it stopped and then proceeded forward.
- General premise: we are looking into this, we are doing a deep dive, we have done some preliminary analysis and this is what we have but it is only preliminary.
- Buckets: before impact, impact, after impact.

Figure 10: Excerpt from notes taken by Cruise employee during October 3 NHTSA pre-meeting.

These NHTSA pre-meeting notes indicate that the view of Fenrick was that the pedestrian dragging was the "Biggest issue candidly. That we moved, and why, is something we are going to

need to explain. The facts are what they are." Wood's proposed response was a technical explanation regarding the fact that Cruise's Remote Assistance had characterized the accident as a "minor collision, so design response is a permissible lane pullover." The contemporaneous notes state further that: "Questions will be: it stopped and then proceeded forward." The notes then document the team's expected response to such a question: "General premise: we are looking into this, we are doing a deep dive, we have done some preliminary analysis and this is what we have but it is only preliminary."

3. Cruise's Meeting with NHTSA on October 3

The virtual meeting between the Cruise team and NHTSA ran from 10:30-11:00 a.m. with six Cruise employees and six NHTSA regulators.

The meeting began with a general overview of the October 2 Accident. Then Wood attempted to play the Full Video. Wood gave a high-level overview of the October 2 Accident but did not narrate or explain the Full Video in any detail, and did not mention the pullover maneuver and pedestrian dragging.[35] In addition, internet connectivity issues hampered the regulators' ability to see the video clearly or in its entirety. According to meeting participants, Wood played the video two or three times but it kept stopping or blacking- or whiting out because his home computer was having connectivity issues.

In addition, on one occasion, according to at least two interviewees, Wood stopped the video after the initial impact, started taking questions from regulators, and then did not resume playing the video. Interviewees did not ascribe any ulterior motives to this occurrence but instead believe Wood got caught up with answering questions and simply failed to restart the video.

[35] The pre-meeting notes indicated that Wood would provide a "video walkthough" at the meeting.

Nonetheless, Cruise interviewees agree that NHTSA did not see the Full Video clearly or in its entirety. And because Cruise employees did not discuss the pullover maneuver and pedestrian dragging, Cruise never informed NHTSA during this meeting that the AV had pulled forward, dragging the pedestrian underneath for approximately 20 feet. Notably, after this pre-meeting, Cruise edited the Talking Points to reflect what was "[Not discussed]" during the NHTSA meeting itself – the question regarding the vehicle's movement after the point of impact.

The fact that the pedestrian dragging was not discussed in this meeting is further corroborated in a Slack message between a Cruise employee who did not attend the meeting and Managing Lead Counsel Andrew Rubenstein, who did. When asked, "[h]ow did it go with NHTSA?" Rubenstein responded: "Actually as well as it could. 'Video was worth a thousand words.' BUT Matt's video cut out before the vehicle started moving again after initial brake. We'll send them the complete video and I think they'll have questions about that." Rubenstein's comment suggests that Cruise anticipated a discussion about the dragging. This is consistent with the pre-meeting Q&As. His comment that the "video was worth a thousand words" is a reference to a statement two NHTSA regulators made at the end of the meeting. As reflected in the meeting notes, they stated: "Thank you for reaching out so quickly. Video worth 1000 words."

During the question-and-answer session, according to meeting notes, a NHTSA regulator asked: "Could RA detect that pedestrian trapped?" Wood responded: "Yes." The NHTSA regulator then asked: "Sensors too?" Wood again responded: "Yes." In addition, some interviewees recalled that in the context of discussing whether the vehicle's Remote Assistance could detect a pedestrian under the vehicle and first responders directive that the AV stay in place

after coming to its final stop,[36] Wood added: "the last thing you would want to do is move when a pedestrian is underneath." After that, recollections differ, with at least two interviewees stating that the NHTSA regulator repeated the same phrase: "The last thing you would want to do is move with a pedestrian underneath." A third Cruise employee in attendance recalled that it was the NHTSA regulator who made this statement initially and that Wood agreed. Regardless of the sequencing, while the statement likely pertained to the importance of leaving the AV in place so that the pedestrian could be safely extracted by first responders from underneath the vehicle, there was some consternation among Cruise employees weeks after the meeting – when Cruise learned of the impending DMV suspension – that the team had not clarified that the AV had, in fact, moved during the course of the Accident. Absent this clarification, and in conjunction with Cruise's failure to discuss the pullover maneuver and pedestrian dragging, Cruise employees later recognized the tangible risk that NHTSA regulators could have left the meeting with the misimpression that the AV had never moved with a pedestrian underneath.

This consternation is reflected in a Slack message exchange between two Cruise meeting attendees, at 9:27 p.m. on October 23 discussing the potential DMV suspension. One of the attendees wrote: "I think we might need to mention the comment Matt made during the NHTSA call that the last thing you would want to do is move with a pedestrian under the car. From my notes and recollection Matt said 'As pedestrian is under vehicle last thing want to do is maneuver' and [the NHTSA regulator] agreed." The other employee replied: "lets see where the conversation goes. if it's relevant, we should share it. That's not the main point here though."

[36] A partial transcript of the conversation between first responders and Remote Assistance ("RA") confirms the first responders directed the AV to stay in place multiple times, telling the RA to disable the vehicle, power down the vehicle, keep the car parked, and make sure the car was not going to move.

Similarly, in a Slack message exchange between Fenrick and Rubenstein at 10:11 p.m. on October 23, Fenrick wrote: "I think we need to let Jeff [Bleich] know about Matt's comment about AV not moving with pedestrian underneath…" Rubenstein responded: "My memory of that comment is vague. I recall Matt saying that first responders directed us not to move and then [the NHTSA regulator] saying 'oh yeah the last thing you'd want to do is move' but I don't recall Matt specifically acceding to or representing that."

Hours later, on October 24, Fenrick again messaged Rubenstein:

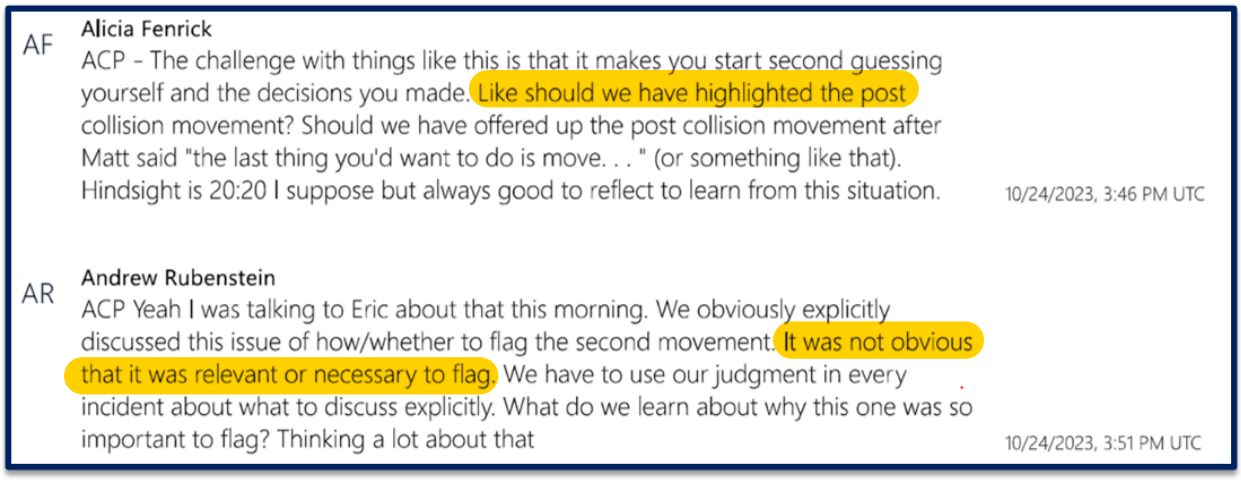


Figure 11: October 24 Slack messages between Deputy General Counsel Alicia Fenrick and Managing Lead Counsel Andrew Rubenstein.

Senior Director of Federal Affairs Eric Danko, in contrast, was resolute about how Cruise handled its interactions with NHTSA on October 3, stating he "stands by it," arguing that NHTSA could have asked questions in the meeting or after it received the video, and that Cruise's employees "have gone beyond their regulatory requirements."

In sum, the evidence shows that the Cruise employees who attended the NHTSA meeting on the morning of October 3 planned to show the Full Video, which depicted the pullover maneuver and pedestrian dragging. They also planned to answer questions about it. But internet connectivity issues interfered with the video showing. And because Cruise employees were so

wedded to "the video speaks for itself" approach of disclosing accident facts to regulators—even when that video was not clearly visible—they failed to raise and provide an explanation as to all that actually transpired during the Accident. As a result, NHTSA left the meeting without being apprised of all the facts regarding the October 2 Accident, including most importantly the pullover maneuver and pedestrian dragging.

Moreover, while Wood's affirmative statement that the "last thing you would want to do is move with a pedestrian underneath," is subject to a logical explanation that he was referring to the pedestrian extraction by first responders, the prudent step would have been to clarify that in this case, the AV did subsequently move, rather than leaving unaddressed a statement that regulators could have misinterpreted. This is particularly true given that Fenrick and others in the NHTSA pre-meeting recognized the significance of the dragging.

4. Cruise's NHTSA Post-Meeting on October 3

Just as the NHTSA meeting was concluding, at 10:59 a.m., a NHTSA employee sent Cruise an email titled "File request: CBI Cruise Pedestrian Incident 10/2/23" with a link to upload video of the Accident. At 1:40 p.m., Cruise sent the Full Video to NHTSA.

5. Cruise's Interactions with NHTSA on October 12, 13, and 16

a. October 12 Call

On October 12, a NHTSA regulator called a Cruise employee and advised that NHTSA was planning on opening a Preliminary Evaluation[37] into the October 2 Accident as well as three other Cruise incidents involving pedestrians.

[37] A PE is the first phase of a NHTSA investigation, which involves a review of consumer complaints or reports suggesting a safety defect may exist. After a PE, NHTSA will determine whether to close the investigation or upgrade it to an engineering analysis to determine whether to initiate a safety recall. https://www.nhtsa.gov/resources-investigations-recalls.

The Cruise employee then informed the Cruise NHTSA team about her conversation with the NHTSA regulator:

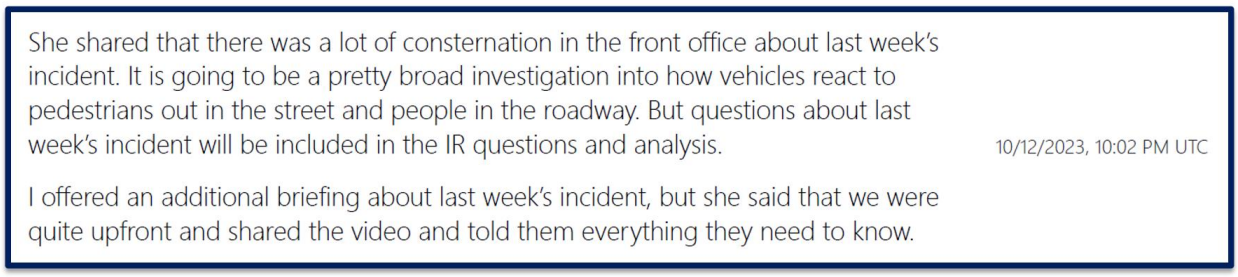


Figure 12: October 12 Slack message from Cruise employee to others in government affairs on the Cruise NHTSA team.

The Cruise employee also indicated that the NHTSA regulator "acknowledged that every time they ask us for something, we willingly give it," but added "it [is] difficult to believe that they could find fault with our reaction to the pedestrian in Panini[38] that would extend beyond asking us additional questions in a follow-up…" According to this Cruise employee, the NHTSA regulator offered to brief Cruise on the PE the following day, which Cruise accepted.

b. October 13 Meeting

On October 13, five Cruise employees from government affairs had a virtual meeting with the NHTSA regulator to discuss the PE. Despite the severe consequences that could result from a PE, including a recall, Cruise's Chief Legal Officer and Senior Vice President of Government Affairs did not attend.[39] Before this telephonic meeting, the Cruise team prepared its "NHTSA –

[38] "Panini" is the name of the AV involved in the October 2 Accident. Cruise named some of its AVs after types of foods.

[39] Both CLO Bleich and SVP of Government Affairs Estrada were aware of the intention to open a PE and the meeting with NHTSA to discuss it. A Cruise employee informed them in a Slack message on October 12: "Want you both to be aware - we just received a heads up call from ODI [Office of Defects Investigation]/NHTSA that they intend to open a PE into us next week regarding our interaction with pedestrians in crosswalks. Not exclusive to Panini but it will include it. There is apparently pressure coming from the front office following the incident, which no doubt is coming from the safety advocates/trial bar. We are scheduling a call tomorrow with ODI to get

Running Talking Points and Notes," which included an agenda of questions as well as comments. Among these was the following recap of the October 3 meeting:

> We're just a little confused by this. We met with you about the Panini incident last week, and the team didn't express any remaining concerns about it, even when asked if you had any additional concerns. Was there really remaining concern about AV behavior regarding Panini? If yes, why did they not request another briefing? We've been extremely cooperative with the Agency and have always provided information that the agency requested. What will be gained by this escalation that we are not already providing? Offer briefing on any of these topics in lieu of PE.

In addition, the Cruise team planned to state:

> Regarding last week's incident we briefed the agency within hours of the event, provided video, and offered repeatedly to share additional information, including around the topic of pedestrian safety broadly. None was requested, which makes us question the motivations behind opening a PE. PEs are punitive means to gather information, and are reputationally harmful, particularly in a nascent industry.

During this October 13 meeting, Cruise interviewees recalled that, as planned, they expressed frustration with NHTSA's decision to open a PE and argued that Cruise had tried to be transparent. In response, some interviewees recounted that the NHTSA regulator said little but did mention that Cruise had failed to disclose in the October 3 meeting that the AV had moved after impact and dragged the pedestrian, and that NHTSA only became aware of these facts after reviewing the video that Cruise sent NHTSA a few hours later. This sentiment is documented in a Cruise employee's notes contemporaneous with the meeting: "Another thing to note - panini, when sent video, and there was another part of the video where AV fully braked and then started

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more information, and will include Alicia and Andrew." The employee offered to send the SVP an invite to the call, and he responded "sounds like something we can address when i'm [in Washington, D.C.] next week."

up again, and dragging the pedestrian. That has a lot of us concerned that you didn't stay stopped. About 7.5 mph."

c. October 16 PE

On October 16, NHTSA opened its PE investigation, stating that "Cruise Automated Driving System (ADS) equipped vehicles may not be exercising appropriate caution around pedestrians in the roadway."[40] The PE identified four incidents, two of which Cruise had reported to NHTSA – including the October 2 Accident – and two that had been posted on social media only.

6. Cruise's NHTSA Reports Regarding the October 2 Accident

Cruise submitted three written reports with NHTSA about the October 2 Accident, as NHTSA's SGO requires when an accident results in injury or property damage.[41] Specifically, the SGO requires that the narrative portion of the report "[p]rovide a written description of the pre-crash, crash, and post-crash details." Despite this requirement, Cruise's first two reports did not mention the pullover maneuver and pedestrian dragging; the third did after consultation with GM.

a. NHTSA 1-Day Report

Under NHTSA requirements, Cruise must notify NHTSA of an accident within 24 hours, an obligation known as the "1-Day" Report. Once that reporting obligation is triggered, update reports must be submitted to NHTSA within 10 days and 30 days of an accident.

[40] NHTSA Investigation PE23018 ODI Open Resume, https://static.nhtsa.gov/odi/inv/2023/INOA-PE23018-11587.pdf, at 1.

[41] Under NHTSA's SGO requirements, "Entities named in the General Order must report a crash if ADS [Automated Driving Systems] was in use at any time within 30 seconds of the crash and the crash resulted in property damage or injury." https://www.nhtsa.gov/laws-regulations/standing-general-order-crash-reporting.

Cruise delegated primary responsibility for these reports to a paralegal who drafted the initial 1-Day Report. Under Cruise's policies, Deputy General Counsel Fenrick and Cruise's Communications Director Erik Moser had to approve the draft before it was filed. In an 11:30 a.m. Slack message, the paralegal sent the following draft to his supervisor Rubenstein, Fenrick, and Moser, asking for approval:

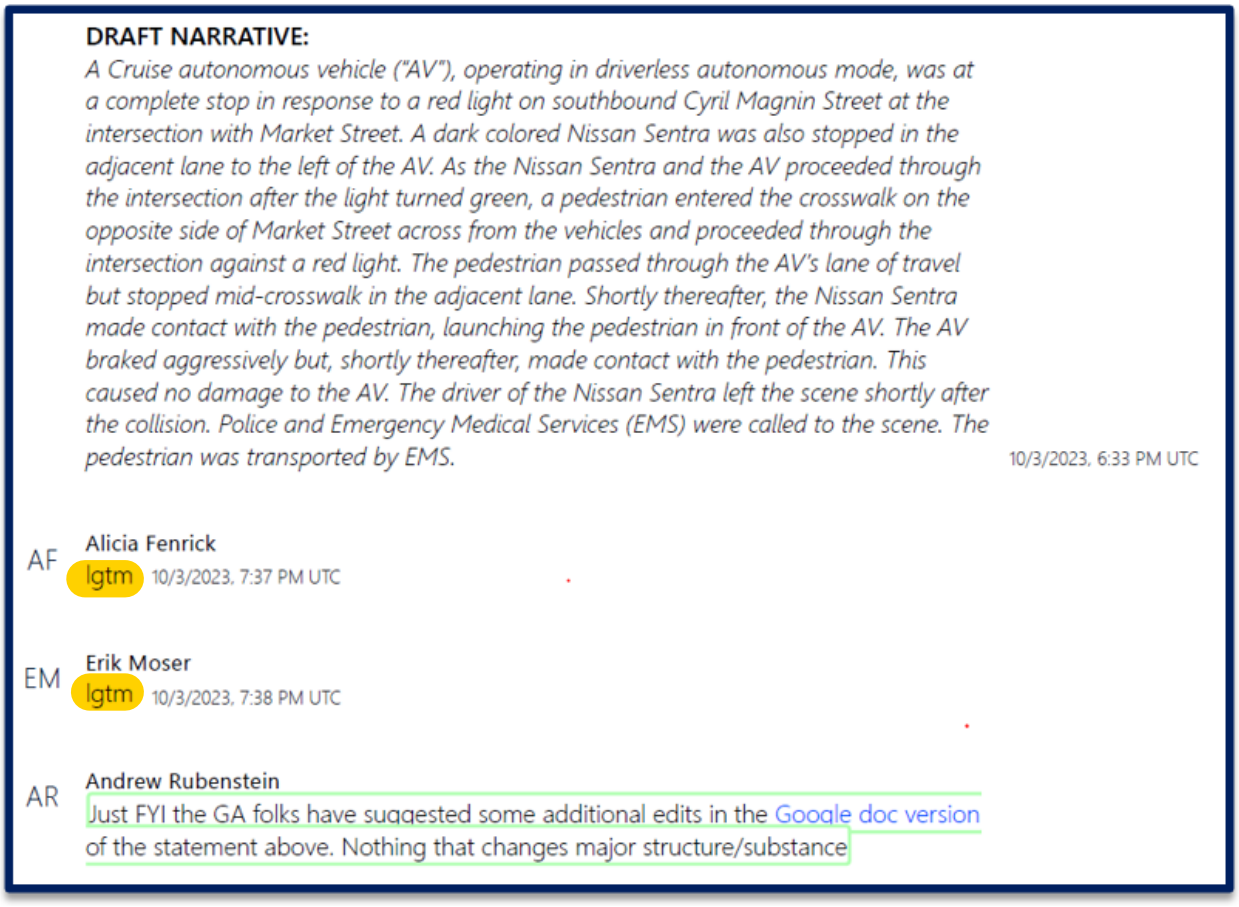


Figure 13: October 3 Slack message from Cruise paralegal to Deputy General Counsel Alicia Fenrick, Director of Communications Erik Moser, and Managing Legal Counsel Andrew Rubenstein regarding draft of 1-Day Report.

Some revisions to the report were then made, as Rubenstein indicated, including adding that the pedestrian passed "completely" through the AV's lane of travel, and changing the phrase "launching the pedestrian in front of the AV" to "deflecting the pedestrian in front of the AV." The line that "this caused no damage to the AV" also was removed. No one discussed whether to

include the pullover maneuver and dragging of the pedestrian in the 1-Day Report. The paralegal said that he was unaware of the pullover maneuver and dragging at the time. He then submitted the 1-Day Report to NHTSA at 2:37 p.m. on October 3.[42]

Although, as noted above, the instructions for the narrative section of the SGO report require submitters to "[p]rovide a written description of the pre-crash, crash, and post-crash details," some Cruise interviewees expressed their belief that the requirements were narrower. In their view, the narrative called for a description of the collision itself, and thus did not include post-collision actions like the pullover maneuver and pedestrian dragging. However, a Cruise employee who established the NHTSA reporting system but was away on vacation during the October 2 Accident believes that the full details of the October 2 Accident should have been included, including the pullover maneuver and pedestrian dragging. Quinn Emanuel's review of the SGO requirements comports with this view.

Cruise subsequently focused on this apparent reporting error in a draft Q&A for an "All Hands" meeting CEO Vogt held with employees after the DMV issued its October 24 Suspension Order. Employees could submit questions to be addressed at the meeting and one of the questions submitted was: "Why was the decision made not to include the post-collision pull-over in the

[42] The same paralegal who prepared the NHTSA 1-Day Report also prepared the required "SR-1" Report of Traffic Accident Occurring in California for the October 2 Accident, which was submitted to the DMV Financial Responsibility Department. This form does not include a narrative of the accident and solely reports insurance information. In addition to the SR-1 form, for some AV accidents, the DMV requires an OL 316 "Report of Traffic Collision Involving an Autonomous Vehicle." This form does include a narrative description, in Section 5 for "Accident Details-Description." Cruise determined that for the October 2 Accident an OL316 was not required to be filed with the DMV. Cruise understood the OL 316 form to apply only to AVs under a DMV testing permit pursuant to 13 CCR § 227.48. It does not apply to AVs under a DMV deployment permit, which is the permit under which the Cruise AV was operating on October 2, 2023.

written report to the NHTSA? At least, this seems like it must have been an intentional decision, not an accidental oversight."

Rubenstein drafted the following response for Fenrick's review:

> The purpose of the NHTSA reporting requirement is to notify the agency of the occurrence of crashes. Consistent with that objective and our usual practice, our report notified NHTSA that the crash had occurred. Additionally, we had already met with NHTSA, including showing the full video to them, prior to submission of the report. That meeting was the result of our proactive outreach: we immediately reached out to NHTSA after the incident to set up a meeting to discuss with them. Our team met with NHTSA in the morning following the incident, including showing the full video to NHTSA. We then submitted the report and sent a copy of the full video later that afternoon.

Fenrick responded: "LGTM," meaning "looks good to me." Ultimately this explanation was not included in the answer Bleich gave at Cruise's October 30 All Hands meeting. Instead, according to the final questions and answers prepared for the meeting, Bleich asked for patience until Quinn Emanuel, which had been retained five days earlier, could complete its review and "get all the facts over the coming days." Still, the explanation as originally drafted provides insight into Cruise's reasons for not including the pullover maneuver and pedestrian dragging in the 1-Day Report. It is difficult to square this rationale with the plain language of the NHTSA regulation itself, which requires "a written description of the pre-crash, crash, *and post-crash details*…." (emphasis added).

b. NHTSA 10-Day Report

Cruise also failed to include the facts about the pullover maneuver and pedestrian dragging in its 10-Day NHTSA Report submitted on October 10. As with the 1-Day Report, Cruise gave significant authority to the paralegal to make decisions related to Cruise's disclosures to NHTSA.

In fact, he was authorized to solely determine whether there was any new information or updates that needed to be included in the Report; if he determined no updates were needed, then he would keep the narrative the same without any second-level or supervisory review of his decision. Also, Cruise only required the paralegal to seek approval if he determined an update was needed.

In determining whether Cruise should include any updates in its 10-Day Report, the paralegal checked with various sources, including asking in Slack whether there were any updates on the incident or on the pedestrian. Thus, in a Slack message to three other employees, the paralegal wrote: "hi, checking in to see if there have been any updates to this incident? In particular, any status on the ped?"

Another Cruise employee who interacts with law enforcement responded: "Unfortunately no. I've reached out to the investigating sergeant but have not received a response. This is probably due to other investigations he may be involved in."

During his interview, this employee explained he was responding only to the paralegal's question regarding the status of the pedestrian's medical condition, not whether there were any updates more broadly. But the paralegal, who never spoke directly with this employee, said he interpreted his message as responding to both of his questions. Accordingly, after checking Cruise's central incident database, RINO, and seeing no updates, the paralegal filed the 10-Day Report without checking with anyone in legal or government affairs.

As a result, the 10-Day Report states: "There are no updates related to this incident since the original submission on October 3, 2023." It then repeats the same narrative as the 1-Day Report, again omitting any mention of the pullover maneuver or dragging of the pedestrian. There is no evidence that any Cruise lawyer or other employee reviewed the 10-Day Report prior to submission.

c. NHTSA 30-Day Report

Cruise undertook a more comprehensive analysis in preparing its 30-Day Report, including review by CLO Bleich, at the urging of GM. Bleich had not previously reviewed either the 1-Day or 10-Day Reports. However, after speaking with GM, he emailed a Cruise employee the same day for a copy of the 1-Day Report, and then asked: "[w]as there any subsequent report to NHTSA that references the second movement or an oral briefing?" The employee responded:

> We submitted the full video to NHTSA pursuant to their SGO authority. In our proactive briefing of NHTSA on 10/3 prior to the SGO submission, we opened with an acknowledgement that we were still gathering information and analysis and would do our best to answer every question that day, and offered to meet again should additional questions arise. Matt described the crash and showed the full video but due to connectivity issues, it blacked out during the post-collision movement. As you know, the focus of the day was on the initial contact with the pedestrian. The call ended and we sent them the full video that included the post-collision movement 2.5 hours later. Prior to opening the Preliminary Investigation, NHTSA did not request or seek any additional information about the incident. When [the NHTSA regulator] advised us of the details of the PE on 10/13, she mentioned the post-collision movement, but declined our offer to provide an additional briefing. The initial SGO report was filed the evening of 10/3. The team that drafted the report believes the SGO obligation is to notify NHTSA of the occurrence of crashes, and thus focused on the crash itself. The 10 day report did not include changes. There is a requirement to file an updated monthly report on 11/15. The team has not discussed updating the report to include the post-collision movement, but we certainly can.

Bleich responded by encouraging the Cruise employee to update and submit the 30-Day Report early to include the pullover maneuver and pedestrian dragging. Bleich added further in a

November 1 email that: "[t]he most important thing now is simply to be complete and accurate in our reporting of this event to our regulators."

In a November 1 Slack message, the Cruise employee communicated Bleich's instruction to Rubenstein, telling him Bleich "is wanting us to explicitly acknowledge the post-collision movement" and asked "that we revise this 'to be complete and accurate in our reporting of this event to our regulators.'" Rubenstein responded that he did not think the pedestrian dragging needed to be included in the 30-Day Report because Cruise was preparing to include that information in the forthcoming 573 recall report to NHTSA. *See* Section IV.B below. But after additional urging from GM and at the direction of Bleich, Cruise then added the following language in its 30-Day Report: "The AV then attempted to pull over out of traffic, pulling the individual forward, rather than remaining stationary." Cruise submitted the 30-Day Report on November 3, 2023.

In sum, Cruise employees, including senior lawyers, did not include the full details of the October 2 Accident in its 1-Day and 10-Day Reports. In addition, Cruise delegated authority to a paralegal to prepare the NHTSA Reports as well as determine whether an accident even triggered a reporting obligation. These should be the responsibilities of lawyers who, in this case, provided little oversight.

7. Conclusions Regarding Cruise's Interactions with NHTSA

Cruise expected and intended its October 3 meeting with NHTSA to follow its past practices in which Cruise employees would show a video of an accident or incident and respond to regulators' questions based upon what they observed in the video. But this did not happen for at least two reasons. There were internet connectivity issues and the Director of System Integrity Wood paused the video at the point of impact, and then never resumed playing it. As a result,

Cruise employees neither received any questions from NHTSA nor proactively informed regulators about the pullover maneuver and pedestrian dragging they were unable to see.

Contrary to Cruise's assumptions, "the video did *[not]* speak for itself." Even if it had played smoothly and fully, Cruise should have affirmatively pointed out and explained to NHTSA exactly what had transpired during the October 2 Accident after the Cruise AV initially hit the pedestrian. Cruise repeated this same mistake in each of its meetings with regulators and government officials on October 3.

D. Cruise's Disclosures to the Department of Motor Vehicles (DMV)

1. Cruise's Initial Outreach to the DMV and Internal Discussion of Which Video to Show

Within hours of the October 2 Accident, at 12:45 a.m., a Cruise governmental affairs employee reached out to the DMV's Chief of the AV Branch to alert the DMV to the Accident and left a voicemail. Then, at 1:10 a.m., right after the 12:15 a.m. Sev-0 Meeting, which Vogt attended, Estrada sent a Slack message to Raman recommending that the Cruise regulator team show a targeted video to regulators:

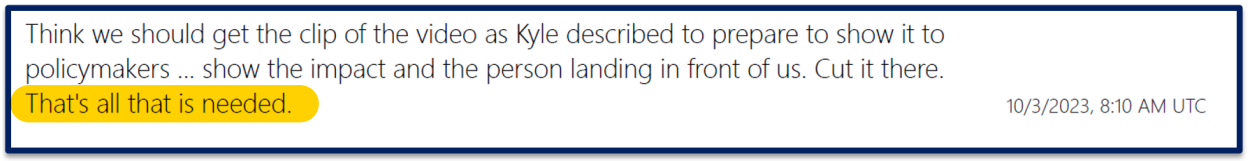


Figure 14: Estrada's Slack message to others in Government Affairs at 1:10 a.m. on October 3.

As discussed above in Section II.D, interviewees reported that Vogt had advocated for and identified camera angles for a shorter 4-second version of the video of the October 2 Accident that only included the Nissan hitting the pedestrian; Cruise employees relayed that Vogt wanted to focus solely on the Nissan's role in causing the Accident and avoid showing the pedestrian's

injuries. Estrada's Slack message appears to be advocating for using Vogt's 4-second version in the briefings with regulators.

After seeing Estrada's message, Raman responded: "I just asked Wood to get us a usable copy – you both are on that slack as well." Raman's 1:12 a.m. Slack message to Wood, with Estrada and Senior Director of Federal Affairs Eric Danko copied, confirms she made the request: "ACP Matt, given last night's Sev 0 and our need to discuss with policymakers, can you please make us a usable video of this angle [link to Webviz]. We only need to show the impact and the person landing in front of us and then cut it there."

Although these Slack communications were before Cruise learned about the pullover maneuver or had access to the Full Video depicting the pedestrian dragging, both Raman and Danko pushed back, advocating for showing what was then the most complete video available: the

14-second video showing the Cruise AV hitting the pedestrian. The Slack chain between Danko, Estrada, and Raman stated:

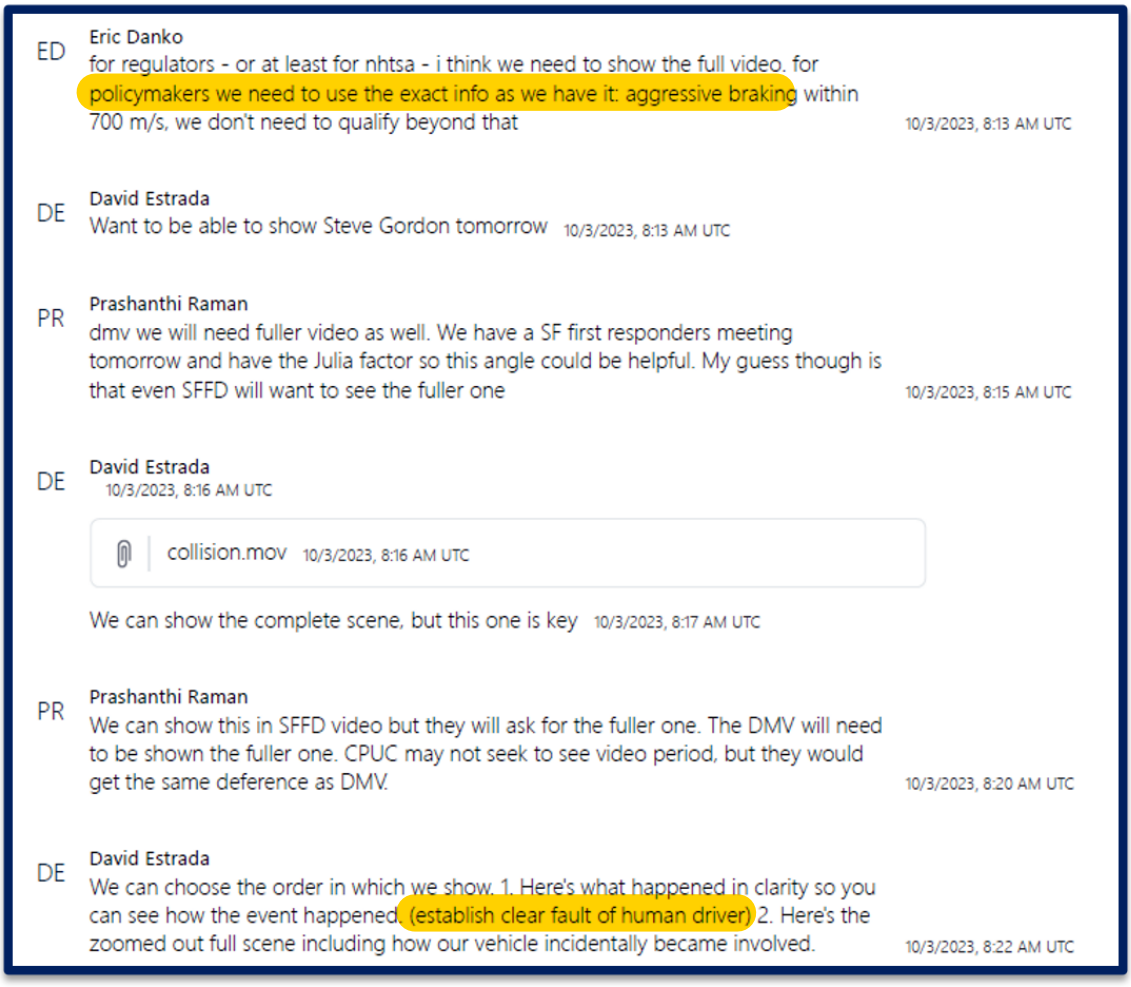


Figure 15: Slack messages between Estrada, Raman, and Danko starting at 1:13 a.m. on October 3.

When Estrada wrote: "this one is key" he attached the 4-second video Vogt directed be cut showing only the Nissan hitting the pedestrian. The Cruise AV did not appear in the video at all.

Raman texted another Cruise employee about this directive at 1:24 a.m.: "Estrada wants to show to regulators that need [the video a] shortened video of an angle just showing clear fault of human drivers… and then can show zoomed out full scene including how our vehice [sic] incidentally became involved." At 3:01 a.m., Wood, who lives in the Eastern Time Zone, replied to Raman's video request, stating: "I'm on it. Just waking up." Twenty minutes later, Wood sent

the requested video, 12 seconds in length, and wrote: "[t]his is the sequence requested. Please let me know if you need any edits and will make myself available for any calls on this event."

After the Full Video depicting the pedestrian dragging became available at 6:28 a.m., the Cruise DMV team discussed which video to show in their pre-meeting, which Estrada did not attend. They ultimately decided to play the Full Video only. Although Estrada does not appear to have attended either the 6:00 a.m. CMT or 6:45 a.m. SLT meetings, respectively, members of the regulatory and legal teams participated and heard discussions about the pullover maneuver and pedestrian dragging.

2. DMV's Response to Cruise's Outreach

On the morning of October 3, in a 4:25 a.m. email, DMV Director Gordon asked: "[l]et me know if you'd like to reschedule our meeting given current events." Gordon was referring to a pre-scheduled in-person meeting at Cruise's offices that day to discuss expanding fleet operations in San Francisco. Estrada responded: "Yes still worth meeting and I understand the team may set the full review meeting at 11:30 so we can go into that while you're on-site."

Separately, at 6:25 a.m., the Deputy Director for the DMV texted Raman who relayed the conversation to Bleich and Estrada in the following Slack message:


• Prashanthi Raman (W0108EBSLBH)PR

ACP Talked to Bernard this morning after receiving his text: OMG. Can anything else go wrong?

He'd like a meeting set up to discuss as we have been doing. He said Steve will ask about the speed of the other vehicle (22 mph), will also ask if the vehicle detected passenger (yes) and if the vehicle did anything to prevent impact (yes- hard braked). They'd like to review full footage with us. I shared that the two of you will likely be sharing video and discussion of the incident with Steve later this morning as well.
10/3/2023, 2:24 PM UTC

Figure 16: Slack message from Raman to SVP of Government Affairs Estrada and Chief Legal Officer Bleich at 7:24 a.m. on October 3.

At 8:17 a.m., Estrada sent a Slack message to Raman and Bleich outlining his plans for the video Cruise should show to the DMV:

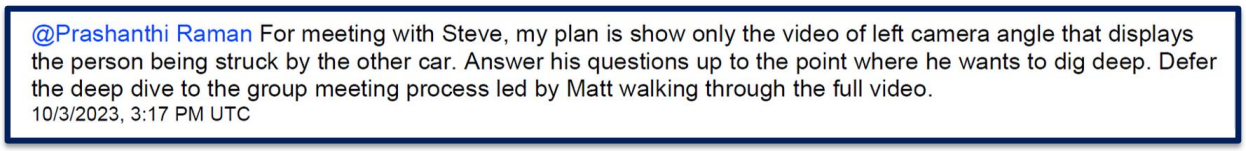


Figure 17: Slack message from Estrada to Raman and Bleich at 8:17 a.m. on October 3.

Bleich responded that he agreed. From this Slack, it appears that Estrada – with Bleich's concurrence – planned for Cruise to show the DMV two versions of the video – the targeted 4-second video that showed only the Nissan hitting the pedestrian without the collision of the Cruise AV and then the Full Video depicting the pullover maneuver and pedestrian dragging. However, a Cruise employee who attended the DMV meeting stated that the 4-second video was not shown. Other interviewees only mentioned the Full Video being shown.

At 8:28 a.m., Estrada emailed DMV Director Gordon again to re-confirm the meeting: "Look forward to seeing you this morning at 11. I know you are generally aware of the incident last night, which we will review in detail with you and your team per our standard operating procedure." He then provided a summary of the October 2 Accident. Notably, his summary did not include any discussion of the pullover maneuver or pedestrian dragging,[43] even though by this time, it had been discussed at two meetings, including one with senior leaders, attended collectively by 109 individual Cruise employees as well as employees in five conference rooms. Although Estrada did not attend either meeting, members of the legal and regulatory teams, including Raman and Danko, are listed as attending the 6:00 a.m. CMT, and Estrada was on the War Room Slack Channel where Wood and another engineer referenced the pullover maneuver and dragging. *See* Sections II.E.2.b-c.

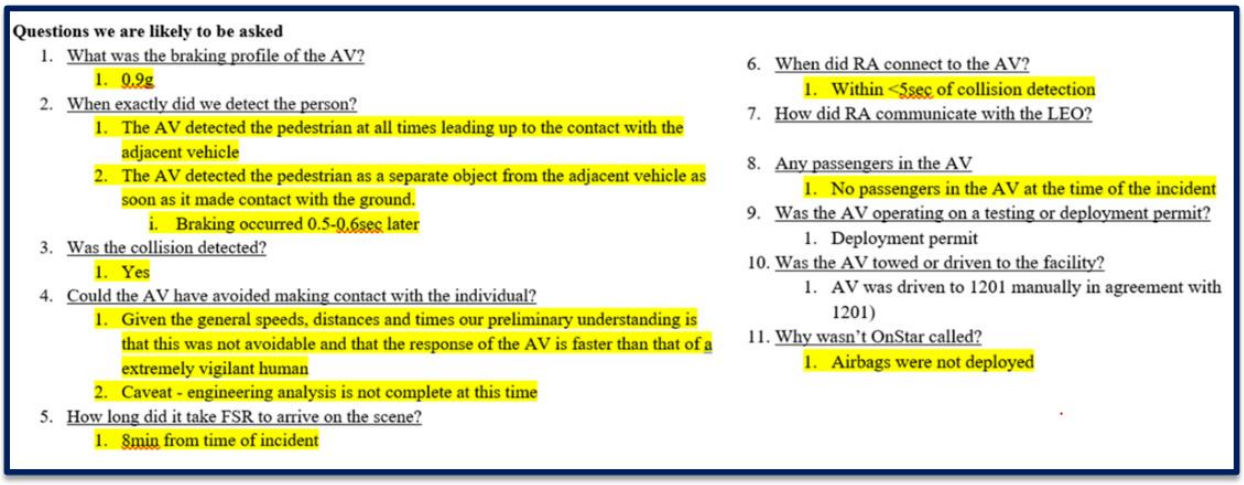
[43] *Vice Media* later cited Estrada's email in an article titled "Cruise Exec Omitted Pedestrian Dragging In Summary of Self-Driving Car Incident to California DMV, Email Shows" https://www.vice.com/en/article/wxjbx5/cruise-exec-omitted-pedestrian-dragging-in-summary-of-self-driving-car-incident-to-california-dmv-email-shows.

3. Cruise's DMV Pre-Meeting

Just before the DMV meeting, from 11:05-11:25 a.m., six Cruise employees from government affairs, operations, and systems integrity convened for a twenty-minute virtual pre-meeting. While Deputy General Counsel Fenrick said she did not typically attend DMV meetings, she opted to attend this meeting in order to have some overlapping attendees between the NHTSA and DMV meetings.[44] Notably, neither Bleich nor Estrada attended the pre-meeting despite planning to meet in-person with the DMV Director to discuss the Accident.

At the pre-meeting, the Cruise team discussed the plan for the DMV presentation. As with NHTSA, Wood planned to describe the accident, play the Full Video, and then respond to DMV questions. The team's talking points included a summary of the Accident but did not include an affirmative discussion of the pullover maneuver or pedestrian dragging though Fenrick and Wood had discussed this in the NHTSA pre-meeting. In addition, Cruise prepared a list of 11 anticipated questions from the DMV and their answers. The DMV team's Q&As were limited to the following:

[44] One of the many flaws with Cruise's approach to disclosing the material facts to regulators was that it had different attendees at the different meetings. There was little continuity and overlap—with the exception of Matt Wood who attended all four meetings and displayed the Full Video in each, or attempted to do so. In addition, some of the attendees were unaware until they saw the Full Video during the meeting with government regulators or officials that the AV had engaged in a pullover maneuver and dragged the pedestrian.



Questions we are likely to be asked

1. What was the braking profile of the AV?
    1. 0.9g
2. When exactly did we detect the person?
    1. The AV detected the pedestrian at all times leading up to the contact with the adjacent vehicle
    2. The AV detected the pedestrian as a separate object from the adjacent vehicle as soon as it made contact with the ground.
        i. Braking occurred 0.5-0.6sec later
3. Was the collision detected?
    1. Yes
4. Could the AV have avoided making contact with the individual?
    1. Given the general speeds, distances and times our preliminary understanding is that this was not avoidable and that the response of the AV is faster than that of a extremely vigilant human
    2. Caveat - engineering analysis is not complete at this time
5. How long did it take FSR to arrive on the scene?
    1. 8min from time of incident
6. When did RA connect to the AV?
    1. Within <5sec of collision detection
7. How did RA communicate with the LEO?
8. Any passengers in the AV
    1. No passengers in the AV at the time of the incident
9. Was the AV operating on a testing or deployment permit?
    1. Deployment permit
10. Was the AV towed or driven to the facility?
    1. AV was driven to 1201 manually in agreement with 1201)
11. Why wasn't OnStar called?
    1. Airbags were not deployed

Figure 18: List of prepared Questions and Answers by Cruise DMV team in a "DMV Prep Doc" ahead of meeting with DMV October 3 (emphasis in original).

The agenda for the DMV meeting also included a link to a video, which was the 12-second video Estrada had requested. The Full Video was not linked in the Agenda. Nonetheless, despite the internal discussion regarding showing the DMV the 12-second video, all but one Cruise meeting participant stated that the DMV was shown the Full Video. The sole employee who disagreed said he shared the DMV's recollection that the Full Video was not shown. A forensic analysis of Wood's computer regarding which video was shown proved inconclusive.[45]

[45] Cruise had its internal security analysts undertake a forensic review of Wood's computer to see if they could establish that the Full Video was played at the DMV meeting October 3. But they were unable to confirm which video was played, as detailed in an October 25 Slack message from a Cruise employee to Bleich, Fenrick, and another attorney. She wrote: "Based on a forensic review of @Matthew Wood's computer, Security has confirmed that Matt was in possession of the 45 second video at the time of the DMV call on 10/3, in addition to other versions of the incident video. It is also confirmed that Matt was sharing his screen for over 20 minutes. Work is ongoing, but likely will not be conclusive, to verify whether Matt showed the 45 second video or an alternative version. **It is not possible** to verify that Matt showed the complete duration of the 45 second video in the 10/3 meeting through the forensic analysis." (emphasis in original). When the Cruise employee alerted Wood to the results of the review, Wood responded in a Slack message that he looked at the file access history on his Windows Media Player ("WMP"), which showed the Full Video was "the only file viewed in the history," and that while he could not recall whether he showed the Full Video to the DMV with the local file via Windows Media Player or "via Chrome/Google Drive" because of internet issues, he determined that based on his view history for WMP "it does show that the 45 sec video was the one I played."

4. Cruise's October 3 Meeting with the DMV

a. DMV Meeting Discussions

The meeting at 11:30 a.m. with the DMV was a hybrid in-person and remote meeting. Bleich, Estrada, and the DMV Director met in person in Cruise's offices while six other Cruise employees, including Raman, Alvarado, Wood, and Fenrick, attended remotely. Eight government officials from the DMV and CHP also attended remotely. Despite being the CLO, Bleich claims he did not know about the pullover maneuver and pedestrian dragging going into the meeting.

Raman and Cruise's Government Affairs Senior Manager Jose Alvarado gave a brief introduction, and then turned the meeting over to Wood to play the video. Contemporaneous notes taken during the meeting reflect that "Matt showed the video a couple times" and "[DMV Deputy Director of Registration Operations] asked to review the video a second time to better understand the behavior of the pedestrian." These notes do not mention any internet connectivity problems. However, the Cruise DMV meeting attendees relayed that information to Quinn Emanuel in interviews.

According to interviewees, Wood played the Full Video a couple of times; however, as with the NHTSA meeting, he encountered internet connectivity problems.[46] After the DMV meeting ended, at 12:00 p.m., Wood messaged Raman on Slack to apologize: "sorry for the bandwidth issues." Raman responded: "it's okay."

Recollections differ somewhat as to which video of the October 2 Accident Cruise showed to the DMV, and more sharply, over whether that video played all the way through to the pullover

[46] After the DMV Suspension Order, a Cruise employee who attended the NHTSA meeting sent a Slack message to a Cruise employee who attended the DMV meeting: "so just to confirm-matt's video glitched on the DMV call too?" The DMV attendee responded: "Yes. A couple of times. It was replayed, but definitely glitched." The NHTSA attendee replied: "ugh what a day for internet issues."

maneuver and pedestrian dragging as a result of the video freezing or blacking-or whiting-out. Although one Cruise employee does not believe the Full Video was played, several other employees believe that the DMV saw the entire video at least once.[47] Others could not recall what video was shown or if the DMV was able to see the dragging. Among Cruise witnesses who recalled that the DMV saw the entire video, at least once posited that the regulators were "shocked" and did not look at the screen when the video showed the dragging. Bleich said he himself did not really watch the video during the meeting, reporting he was focused more on watching the DMV's reaction to it. He said he left the meeting still unaware of the pullover maneuver and pedestrian dragging and he could not recall whether the video depicted the pedestrian dragging. In fact, Bleich claims he remembers first learning of the dragging around noon on October 3, either at the CMT meeting or just before it.

The perspective of these Cruise employees differs sharply from the DMV regulators at the meeting, who said they do not believe that the Full Video was played or that the pullover maneuver and pedestrian dragging were depicted. According to the DMV's October 24 Suspension Order, "[t]he video footage presented to the department ended with the AV's initial stop following the hard-braking maneuver. Footage of the subsequent movement of the AV to perform a pullover maneuver was not shown to the department and Cruise did not disclose that any additional movement of the vehicle had occurred after the initial stop of the vehicle."

Without conclusive forensic evidence, Quinn Emanuel cannot definitely determine which video Cruise showed, or attempted to show, the DMV, but the weight of the evidence points to the Full Video. There is also no indication that Cruise showed either the 12-second or 4-second video

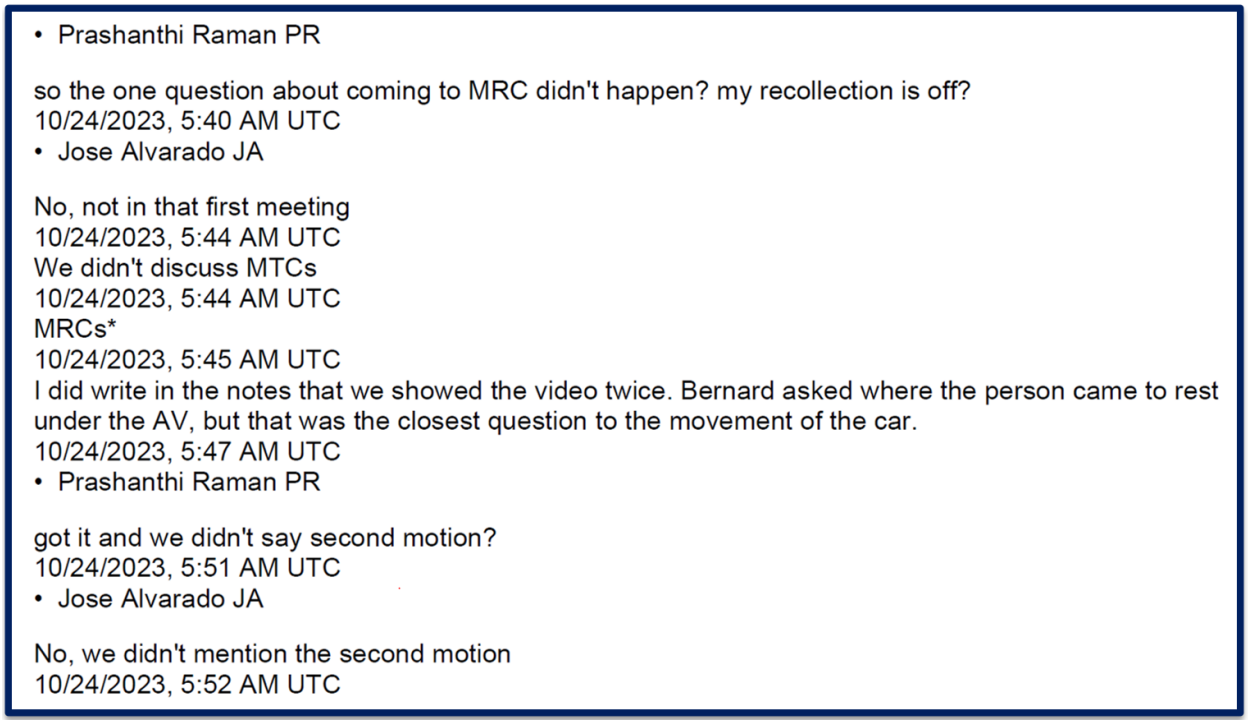
[47] In Slack messages, one lawyer who did not attend the DMV meeting wrote: "I thought they hadn't seen the 45 second version?" Wood responded: "They have."

versions that stopped before the Cruise AV hit the pedestrian. However, despite the Full Video likely being shown, there is a significant likelihood that regulators were unable to see the pullover maneuver and pedestrian dragging as a result of internet transmission issues.

In any event, the debate over which video was shown is really beside the point when Cruise indisputably did not affirmatively tell the DMV that the pedestrian had been dragged underneath the Cruise AV for 20 feet. The closest it appears Cruise came to discussing that the AV moved after the initial collision was, as Wood and Raman recalled, when Wood mentioned that the AV went to a "minimal risk condition," or "MRC." The DMV requires autonomous vehicles to come to a safe controlled stop through a MRC. The DMV defines a MRC as "a low-risk operating condition that an autonomous vehicle automatically resorts to when either the automated driving systems fails or when the human driver fails to respond appropriately to a request to take over the dynamic driving task."[48] While DMV meeting attendees may well have understood what a MRC meant, that does not mean the mere mention of that term would have put these regulators on notice that a pedestrian was trapped underneath the AV when it engaged in a MRC, much less that this pullover maneuver resulted in the AV dragging the pedestrian for approximately 20 feet. Moreover, there is no mention of MRC being discussed in the brief meeting notes Alvarado took. To the contrary, his contemporaneous notes confirm that the pedestrian dragging was not discussed.

After the DMV Suspension Order on October 24, Raman and Alvarado discussed in a Slack exchange whether MRC was raised:

[48] Cal. Code Regs. Tit. 13, § 227.02(i).


• Prashanthi Raman PR

so the one question about coming to MRC didn't happen? my recollection is off?
10/24/2023, 5:40 AM UTC
• Jose Alvarado JA

No, not in that first meeting
10/24/2023, 5:44 AM UTC
We didn't discuss MTCs
10/24/2023, 5:44 AM UTC
MRCs*
10/24/2023, 5:45 AM UTC
I did write in the notes that we showed the video twice. Bernard asked where the person came to rest under the AV, but that was the closest question to the movement of the car.
10/24/2023, 5:47 AM UTC
• Prashanthi Raman PR

got it and we didn't say second motion?
10/24/2023, 5:51 AM UTC
• Jose Alvarado JA

No, we didn't mention the second motion
10/24/2023, 5:52 AM UTC

Figure 19: Slack messages between Raman and Alvarado October 24 after reviewing Alvarado's notes from October 3 DMV meeting.

b. Cruise's Post-DMV Meeting Reflections

After the October 3 DMV meeting, the Cruise team continued to discuss how the DMV meeting went and whether regulators understood all of the facts about the Accident, including the

dragging. Thus, in a 12:13 p.m. Slack message between Raman and Fenrick just after the DMV meeting ended, Raman asked:

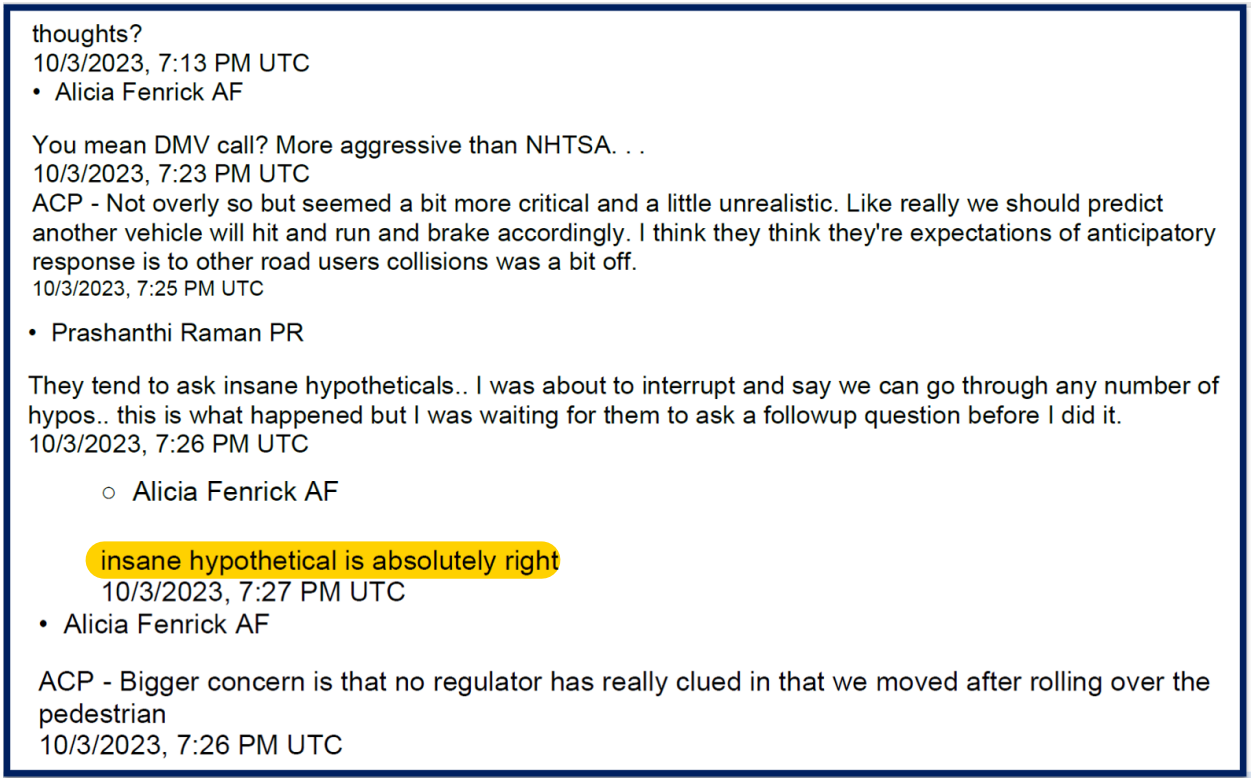


Figure 20: Slack messages between Raman and Fenrick October 3 after the meeting with DMV.

Cruise employees also reflected on the meeting in subsequent debrief discussions. In one such exchange, Raman wrote: "do we know for sure we didn't note that it was a person." Raman then added: "I believe there wa sa [sic] a convo about this. it was like one question. does everyone remember that the same as me." Wood responded: "I do." The Cruise attendee who stated in an interview that he did not believe the Full Video was shown replied: "i remember [the DMV's] version of this…[emoji] but that probably speaks to the fact that it was the next day and quick."

Alvarado later added, again reflecting on the October 3 meeting:

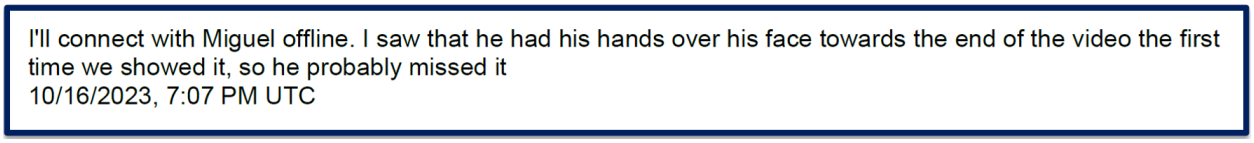

I'll connect with Miguel offline. I saw that he had his hands over his face towards the end of the video the first time we showed it, so he probably missed it
10/16/2023, 7:07 PM UTC

Figure 21: October 16 Slack messages between members of government regarding DMV meeting October 3.

In subsequent interviews about the DMV meeting, one Cruise employee not in the meeting stated that a Cruise employee who had been in the DMV meeting expressed relief afterwards that DMV had not raised pedestrian dragging, stating: "the car moved and they didn't ask and we're kind of lucky they didn't ask." The interviewee expressed discomfort with this comment. A second interviewee confirmed that the source of this information had recounted that the Cruise employee in the meeting had said something to effect of "phew, DMV didn't notice" the dragging and "we dodged a bullet."

Slack messages also indicate that another senior Cruise employee expressed relief that the DMV did not observe the dragging. In a November 17, 2023 text message exchange between two Cruise employees discussing a *Vice* article titled "Cruise Exec Omitted Pedestrian Dragging in Summary of Self Driving Car Incident to California DMV, Email Shows," one employee wrote about another Cruise employee who had participated in the DMV meeting that "[a]fter the DMV call, I heard him tell people we were lucky they didn't pick up on the dragging." This employee later clarified that while he did not directly hear the comment from the DMV participant, he "heard something like [DMV] didn't notice and that was a good thing." While he could not recall the source of that information, his takeaway was that was "the general consensus about [the DMV] meeting."

5. Cruise's October 10 Communications with DMV

After the October 3 meeting, the DMV sent Cruise a letter asking for additional information. The letter stated:

> Please provide a full video of the crash involving AV *Panini* that occurred on October 2nd in San Francisco, CA to the department by no later than October 11th at 12:00 am Pacific. Please note that we are requesting video that includes the nine camera views from 60 seconds prior to contact with the pedestrian to the point where Law Enforcement instructs the Remote Assistant to disable the autonomous technology.[49]

Cruise elected not to provide the video that evening but it did show what it thought was a video responsive to the DMV's request at a meeting on October 13. *See* Section III.D.7.

6. Cruise's October 11 Meeting with the DMV

On October 11, Cruise had a pre-scheduled hybrid virtual and in-person meeting with the DMV on another matter. There were seven Cruise employees who attended from government affairs, operations, and systems integrity, and four DMV officials.

Cruise participants recalled that the October 2 Accident and the DMV's October 10 video request were not discussed. However, a contemporaneous Slack message from a Cruise employee reflects that DMV's video request came up briefly and that Cruise in response "did not commit to anything." Due to technical issues, the government affairs and legal teams discussed on Slack that the video would "not look like a longer version of the 45 second video," but would instead be a 6-pane recording of the 60 seconds-before and eight minutes after the Accident. The DMV emailed

[49] The DMV's request generated a series of Slack messages among the Cruise government affairs, legal, and regulatory groups regarding whether to produce video, what video to produce, and when, citing legal concerns. Cruise ultimately decided not to produce the video that night and waited until a meeting on October 13 to share video they had prepared, which turned out not to be what the DMV wanted.

Cruise a secure portal to upload the requested video on October 11. A Cruise government affairs employee called the DMV on October 12 to explain that Cruise would like to share the video before uploading it, and followed up with an email reiterating the point. The Cruise employee then set a remote meeting with DMV for October 13.

7. Cruise's October 13 Meeting with the DMV

On October 13, Cruise and the DMV met again to review the video the DMV had requested. There were seven Cruise employees who attended from government affairs, operations, and systems integrity, and nine DMV and CHP officials.

Cruise shared a nine-minute, 6-camera pane video that Wood had put together. The video was produced in two parts. The first video was four minutes and 51 seconds in length, capturing the 60 seconds before the collision through the impact, including the pullover maneuver and bystanders looking under the car and calling on their phones. The second video captured the response by SFPD and SFFD. Notably, the camera angles did not include the lower frontal camera angles that most clearly showed the AV's impact with the pedestrian and pullover maneuver. This video only depicted the pedestrian's legs underneath the vehicle from one of the side angles.

DMV regulators had many questions about the video. In contemporaneous notes taken from the meeting, "[A DMV official] asked when the video started and stated that it feels that we skipped over some portion of it." The notes then indicate that Wood "clarified the time stamp on the first and second video to show continuity." Finally, the meeting notes stated that: "[A DMV official] wants to confirm that the AV stopped until it connected to RA [Remote Assistance] and first responders [arrive]." The notes also indicate that at "9:37 pm [Cruise] start[ed] communicating with first responders," a reference to when the Remote Assistance operator in Arizona spoke through the car to first responders on the scene, who asked that the car stay in place.

DMV regulators were not satisfied with the video Cruise showed them during this meeting, according to Cruise interviewees, and insisted on seeing the 45-second Full Video instead. A DMV official is reported to immediately have said: "this is not the video we saw, where is the 9 camera view?" Interviewees said that the DMV's tone in the meeting "felt very mistrustful" and that it "felt like something was not right here."

In a Slack message shortly after the meeting, Raman recapped the meeting for those not on the call, writing:

> [T]he new videos we produced were appreciated. However, @Jose Alvarado confirmed with [DMV] that the DMV only wants the original video we showed them last week uploaded. I will give [DMV officials] feedback on Monday that we were attempting to be responsive to their specificities of the RFI, so to assist us in the future with being clearer on what they are looking for as I know it has downstream impacts on our team. Thank you for pulling all of the videos together @Matthew Wood.

In response to the DMV's request, Cruise immediately uploaded the Full Video to the DMV online portal at 12:19 p.m.

8. Cruise's October 16 Meeting with the DMV

The Cruise team had a pre-scheduled meeting with the DMV on Monday, October 16 to discuss other matters. This included five Cruise employees from government affairs, operations, and systems integrity, and nine DMV and CHP officials. However, the meeting quickly became tense, when DMV regulators accused Cruise of not sharing the Full Video with them at their October 3 briefing on the Accident.

Cruise interviewees recalled that the DMV and CHP attendees were angry about the October 3 presentation, saying their collective memory was that they were not shown the Full Video. According to interviewees, one DMV representative said that Cruise had "misled" them

and another, a CHP official, said that Cruise had an "affirmative duty" to tell them things even if they did not ask, reiterating that Cruise had not called their attention to the pedestrian dragging. Raman responded that they had showed the DMV and CHP the Full Video but would take that feedback back as an action item to improve upon.

Slack messages sent between two Cruise employees as they sat in the meeting confirm they believed the DMV had seen the Full Video on October 3. One messaged at 11:33 a.m.: "are we clarifying that it was the same video?" The other responded at 11:38 a.m.: "Yeah, I was just going to confirm with you that we did show them the full video. I remember we did. But they did not notice." This appears to be a reference to the DMV during the October 3 briefing not noticing that the AV pulled forward, dragging the pedestrian underneath. The first employee responded: "yes but matt had technical difficulties," and the other replied: "Not the the [sic] last part at least."

In addition to DMV and CHP representatives raising concerns that Cruise did not show them the Full Video at the October 3 meeting, they also asked questions related to why the AV moved forward. As Cruise's internal meeting notes reflect, regulators asked:

> Why does the AV move forward as the pedestrian is stuck underneath the AV?;
> Is RA connected to the AV at that time?; and
> Did the AV make the decision to move forward on its own?

Cruise responded "yes" to questions two and three.

As for why the AC moved forward, Cruise responded:

> Initial collision was detected and triggered. Collision triggered a MRC which pulls to the side of road. Additional MRC was triggered with pedestrian underneath the AV. Brings AV to a final position of rest during prior MRC execution. RA input occurs after this stop - confirms collision and interacts with first responders.

After the October 16 meeting, Raman alerted Estrada and Bleich about the concerns the DMV and CHP expressed. In a Slack message to them, she wrote:

ACP CHP was not happy on that call - said that they weren't being confrontational but that it seemed like we didn't go into as much depth or stopped the video after the first impact or the like. I indicated that they did ask about the vehicle continuing and we had a MRC conversation then but it was not the focus of the call. We also acknowledged that Matt had IT issues. I also defended us but said we always take this us as a learning opportunity for us to be better but that it doesn't serve anyone if we were trying to hide this if that's what they were insinuating and that they were in fact being confrontational. Jose is talking to Miguel within the hour to further smooth things over and I will call Bernard if necessary as well. I also am working with Matt and Comms team to see if we can address any improvements we are making with perception etc to showcase that even in edge case scenarios in the rarest of rarest of ones, we will deep dive and see where we can continuously improve.
10/16/2023, 7:53 PM UTC
• David Estrada DE

Hi @Prashanthi Raman. I'm confused about the sequence of events here. The videos I've seen that we have showed multiple times now all show the vehicle stop, and then continue until final stop. What is the source of unhappiness with CHP?
10/16/2023, 8:47 PM UTC
• Prashanthi Raman PR

They believe 1) they didnt see that portion 2) the video we uploaded is different than the one we showed them (they've fallen back on that argument) and 3) we didn't point and focus on that specific portion of the video like we did today when we again were asked to walk them through it. I reminded them that they had been a question regarding why the vehicle continued on, that we addressed it and that discussion was about 30 seconds long.
10/16/2023, 8:50 PM UTC
• Jeff Bleich JB

Thanks for the update. I'm online now. Let me know how it goes
10/16/2023, 8:52 PM UTC

Figure 22: October 16 Slack message from Vice President of Government Affairs Prashanthi Raman to Senior Vice President of Government Affairs David Estrada and Chief Legal Officer Jeff Bleich, and their responses.

Raman and Alvarado then attempted damage control, reaching out to their contacts at the DMV and CHP. In a Slack thread the evening of October 16, Alvarado wrote:

> I finally connected with [the DMV official] late tonight. He did not provide much of an update and didn't discuss next steps, but he told me to check in with him tomorrow at EOD once he has had a chance to discuss today's meeting with the larger DMV team. [The DMV official] did hint that they will have additional questions on Panini and that they want to close out this incident before moving on to our ramp up plan. I took the opportunity to restate that the video we showed him the day after the incident was the same video that we uploaded last week, He told

> me that believes us, but that we still did not go over the end of the video in detail and therefore they missed the portion of the video where the car attempts a second MRC [minimal risk condition].

Similarly, Raman wrote:

> Also talked to [a CHP official] for about 30 minutes this evening. He said they felt like they were 'punked' but also got him to a place where he said I am still your advocate, I believe in this technology, both of us could have done better here and we should pay more attention and @Matthew Wood's verbal walk through as he did today is as helpful as it is to see the video. TLDR[50] - we got to a good place - and he apolgized [sic] but felt like he needed to say what the team was thinking. It's a good lesson to us that they rely on us a lot more than we anticipate and the trust that we've built us great but it's fragile just as all relationships. We rehabilitated the dynamic I believe.

Raman then left on a work trip to Tokyo with CEO Vogt and said she told Vogt about the meeting with the DMV.

9. Cruise's October 23 Communications with the DMV

Raman said on October 23, she called a Cruise political consultant to ascertain why the DMV was silent regarding Cruise's request to expand its autonomous fleet operations in San Francisco, as had been discussed in meetings with the DMV in the prior weeks. The consultant agreed to look into the issue. He called Raman back that afternoon to let her know that an official from the Governor's Office had relayed to him that the DMV was "pissed" at Cruise because the DMV "does not believe they were shown the full video and were considering revocation."

[50] TLDR is understood to be an abbreviation for "too long, didn't read," and typically means "bottom line" or "takeaway."

Raman recalled her response being "excuse me," and that she was "so taken aback." That evening, the consultant called Raman back to confirm that his contact in the Governor's Office had conveyed that the DMV would be suspending Cruise's permit and would be announcing the suspension the next day, October 24.

Raman alerted others in Cruise's government affairs, including Estrada, to the impending suspension. Estrada who had been absent from the October 13 and 16 meetings, then called DMV Director Gordon, emphasizing that the Full Video had been shown in the October 3 meeting multiple times. According to Estrada, Gordon took the position that either the video was not shown or that the Cruise team should have highlighted the pullover maneuver and pedestrian dragging. Estrada recounted that when asked about the impending suspension, Gordon "indicated multiple times that he has an arms length relationship to the investigation and that he was not aware of what if any actions his team was going to take on this."[51]

Estrada then sent CLO Bleich a Slack message indicating that he had talked to the DMV Director and there was "[n]o indication whatsoever that they are considering revoking." Estrada also informed Raman, who then spoke with the political consultant again. She subsequently let Estrada know via Slack message: "[t]alked to [the consultant]. Don't think [the DMV director] is lying. [The political consultant] clarified that [the Governor's Office official] is saying in her conversations they are so angry that she viewed it as moving towards a revocation not an equivocal 'we are doing it.' Apparently their level of emotion is very high," referring to the DMV.

[51] Estrada relayed this information in a document titled "ACP - DMV Interaction Timeline: Panini" created by members of government affairs and legal teams after the DMV Suspension Order to document "[a]ll Cruise interactions with the CA DMV from the start of the Panini Incident."

Although the government affairs team believed on the night of October 23 that the DMV's Suspension Order was not definite, they continued to seek clarification as to what video Cruise showed the DMV in the October 3 meeting. Estrada messaged Bleich that he spoke with Wood who "confirmed he showed the same video in all the meetings. Only issue was video display glitches. Ultimately DMV saw the full video in our meeting and NHTSA got the video sent to them."

10. DMV's October 24 Suspension Order

The following morning, October 24, Estrada again called DMV Director Gordon to ask about whether the DMV intended to suspend Cruise's permit. According to Estrada, the DMV Director reiterated: "he has an arms length relationship to the investigation and that he was not aware of what if any actions his team was going to take on this."

Kyle Vogt then joined the call to speak with Gordon. Vogt said he viewed his call as a "Hail Mary" and that he asked Gordon: "is there anything we can do to prevent suspending the permit. Is this what we want to do for the industry? Suspending the permit based on human led accident?" Vogt said he "was trying to buy us more time by having this conversation at a leadership level," and, thus, he made a "personal appeal," telling Gordon he has "been committed to this since he was 13 to try and improve driver safety."

Gordon replied that the DMV and CHP attendees at the October 3 meeting did not remember seeing the Full Video on October 3. Vogt told Gordon: "we did show you the Full Video" but said he otherwise "did not press that issue because it was the hot item" and he "did not want to dig [his] heels in" given that he was trying to "work around it and find a path forward."

According to Estrada, during their call, Vogt explained that Cruise's focus in the October 3 meeting was on advising regulators that, contrary to media reports, a human driver, not the Cruise

AV, had caused the October 2 Accident. Estrada recalled Vogt explaining to Gordon that Cruise had viewed the matter as primarily focusing on the initial collision but that they "fully understand with the benefit of hindsight that appropriate attention should have been paid to the movement of the vehicle after initial impact, and he took ownership of that on behalf of Cruise."

Vogt said he asked: "can we find another way to resolve our differences?" Vogt said Estrada then tried to ask for an appeal process and delay procedurally, and according to Vogt, Gordon said he would consider it. While Vogt said Estrada walked away from the call hopeful, Vogt did not think their appeals would work.

After their conversation with the DMV Director, Estrada messaged Bleich that Raman was calling another DMV official "to beg for 1 day of discussions and cooperative approach prior to their announcement. Understanding that's a long shot at best. Kyle and I asked Steve for the same and he said he would consider."

Raman spoke with the DMV official, who confirmed the DMV was moving forward with suspending Cruise's permit and, according to her, promised to send the official order and statement to her before it went public. At 10:28 a.m. on the morning of October 24, Raman received an email from the DMV with the Suspension Order, the same time the Order was announced publicly.

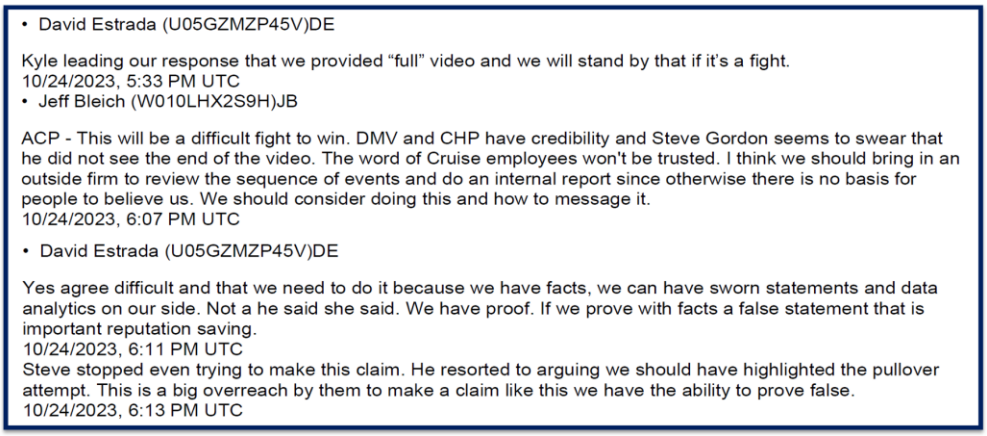
The basis of the Suspension Order was twofold. First, the DMV suspended Cruise's permit under 13 CCR § 227.42(c):

> [T]he department shall immediately suspend or revoke the Manufacturer's Testing Permit or a Manufacturer's Testing Permit – Driverless Vehicles if a manufacturer is engaging in a practice in such a manner that immediate suspension is required for the safety of persons on a public road…Although the accident involved a vehicle operating under Cruise's deployment permit, the behavior of the vehicle raises concerns that vehicles operated under Cruise's driverless testing permit also lack the ability to respond in a safe and appropriate manner during incidents involving a pedestrian.

Second, the DMV suspended Cruise's permit under 13 CCR § 227.42(b)(5):

> Any act or omission of the manufacturer or one of its agents, employees, contractors, or designees which the department finds makes the conduct of autonomous vehicle testing on public roads by the manufacturer an unreasonable risk to the public…During the meeting on October 3, 2023, Cruise failed to disclose that the AV executed a pullover maneuver that increased the risk of, and may have caused, further injury to a pedestrian. Cruise's omission hinders the ability of the department to effectively and timely evaluate the safe operation of Cruise's vehicles and puts the safety of the public at risk.

The Suspension Order required Cruise to "cease all operations of autonomous driverless test vehicles on public roads until Cruise LLC has demonstrated to the department that the manufacturer has taken appropriate action to correct the deficiencies that caused the suspension." Along with the Order, the DMV provided Cruise with a set of Reinstatement Questions that Cruise must answer before the DMV would consider reinstatement of Cruise's permit.[52] After the Suspension Order, Estrada and Bleich messaged each other on Slack.



- David Estrada (U05GZMZP45V)DE

Kyle leading our response that we provided "full" video and we will stand by that if it's a fight.
10/24/2023, 5:33 PM UTC

- Jeff Bleich (W010LHX2S9H)JB

ACP - This will be a difficult fight to win. DMV and CHP have credibility and Steve Gordon seems to swear that he did not see the end of the video. The word of Cruise employees won't be trusted. I think we should bring in an outside firm to review the sequence of events and do an internal report since otherwise there is no basis for people to believe us. We should consider doing this and how to message it.
10/24/2023, 6:07 PM UTC

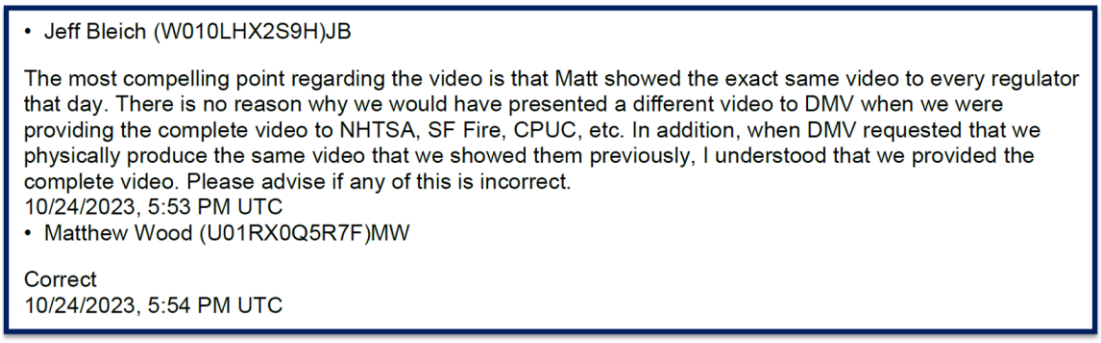
- David Estrada (U05GZMZP45V)DE

Yes agree difficult and that we need to do it because we have facts, we can have sworn statements and data analytics on our side. Not a he said she said. We have proof. If we prove with facts a false statement that is important reputation saving.
10/24/2023, 6:11 PM UTC
Steve stopped even trying to make this claim. He resorted to arguing we should have highlighted the pullover attempt. This is a big overreach by them to make a claim like this we have the ability to prove false.
10/24/2023, 6:13 PM UTC

Figure 23: October 24 Slack messages between Senior Vice President of Government Affairs David Estrada and Chief Legal Officer Jeff Bleich.

[52] These reinstatement questions include requiring Cruise to provide the DMV with the following: (i) a root cause analysis for the October 2 Accident; (ii) any changes Cruise has implemented and a demonstration of how those changes have been tested and validated; (iii) demonstrated changes Cruise has made to safety procedures and safety hazard analysis involving vulnerable road users; (iv) training updates related to changes to safety procedures and interactions involving vulnerable road users; (v) a detailed explanation of why Cruise did not initially share complete and unedited incident data with DMV; (vi) a description of any procedural

Cruise also set up a larger Slack channel with its government affairs, legal, and communications teams to address the fallout. In this Slack channel, Bleich pointed out that Cruise would have no reason to show the video to some regulatory agencies but not others:



- Jeff Bleich (W010LHX2S9H)JB

The most compelling point regarding the video is that Matt showed the exact same video to every regulator that day. There is no reason why we would have presented a different video to DMV when we were providing the complete video to NHTSA, SF Fire, CPUC, etc. In addition, when DMV requested that we physically produce the same video that we showed them previously, I understood that we provided the complete video. Please advise if any of this is incorrect.
10/24/2023, 5:53 PM UTC

- Matthew Wood (U01RX0Q5R7F)MW

Correct
10/24/2023, 5:54 PM UTC

Figure 24: October 24 Slack message from Chief Legal Officer Jeff Bleich and response from Director of Systems Integrity Matt Wood posted to Slack channel discussing DMV suspension.

11. Post-October 24 DMV Communications

At 10:49 a.m., Vogt posted a blog post addressing the Suspension Order and the October 2 Accident titled "A detailed review of the recent SF hit-and-run incident." The post included:

> The AV detected a collision, bringing the vehicle to a stop; then attempted to pull over to avoid causing further road safety issues, pulling the individual forward approximately 20 feet. The driver of the Nissan Sentra fled the scene after the collision. Shortly after the incident, our team proactively shared information with the California Department of Motor Vehicles (DMV), California Public Utilities Commission (CPUC), and National Highway Traffic Safety Administration (NHTSA), including the full video, and have stayed in close contact with regulators to answer their questions.[53]

changes Cruise has made to provide complete and unedited incident data; (vii) Cruise's full analysis as to whether AV Panini's subsequent actions after coming to a complete stop represent an unreasonable risk to safety, and (viii) all materials given to NHTSA with respect to their investigation.

[53] The CPUC later took issue with this blog post, as addressed below in Section IV.C.

12. Conclusions Regarding Cruise's Communications with the DMV

The evidence shows that Cruise intended to affirmatively disclose the Accident to the DMV, including the pullover maneuver and dragging of the pedestrian, by playing the Full Video for it. Moreover, the balance of the evidence also shows the Full Video was played, or attempted to be played, at the DMV meeting on October 3, but it is clear that the DMV left the meeting without realizing or understanding that the AV had pulled forward, dragging the pedestrian underneath it. The reasons are two-fold, and not the DMV's fault.

First, due to the internet difficulties with Wood's computer, the video may well have frozen or blacked- or whited-out during key portions, including the pullover maneuver and dragging. Even if the Full Video played through without transmission issues in one or more showings, no one at Cruise called the DMV's attention to the pullover maneuver and pedestrian dragging. Moreover, several interviewees recalled that some of the DMV representatives were not watching the entirety of the video, some due to "shock" and having their head in their hands as a result of seeing the pedestrian injured.

Second, because the Cruise team's approach was to let "the video speak for itself," they never saw the need to affirmatively raise or point out to the DMV the pullover maneuver and pedestrian dragging; instead, the Cruise employees planned to wait to respond to specific questions from the regulators. While three interviewees recall there may have at least been a brief mention of the AV achieving a "minimal risk condition," which would tell anyone who knew that terminology that the AV attempted to pull over, there was no explicit mention by Cruise meeting attendees that the AV dragged the pedestrian underneath the vehicle for approximately 20 feet while executing this maneuver. Cruise should have informed a key regulator like the DMV of all material facts surrounding the October 2 Accident, and not have relied on a video to do so. When

the DMV did not know to ask about the pullover maneuver and pedestrian dragging, Cruise attendees should have volunteered it, and not sat silently.

The issues with what transpired in the DMV meeting are captured by Bleich's Slack exchange with COO Gil West after the Suspension Order on October 24. West asked: "Can you share the list of DMV concerns with me, as I haven't seen the details?" Bleich responded:

> [T]he main concern from DMV was that our vehicle did not distinguish between a person and another object under its carriage originally, and so went into an MRC. Second, they felt that we should have emphasized the AV's second movement right away in our first meeting. In fact, in the first meeting -- although we showed them the full video -- they (and we) were focused on confirming that we were not operating unsafely before the collision and we did not cause the initial contact with the pedestrian. They did not focus on the end of the video and -- because they did not raise it -- our team did not actively address it.

Vogt also expressed frustration about the DMV Suspension Order: "I am very much struggling with the fact that our GA team did not volunteer the info about the secondary movement with the DMV, and that during the handling of the event I remember getting inconsistent reports as to what was shared. At some point a bad judgement call must have been made, and I want to know how that happened." Bleich responded:

> ACP -- I share your concern that the second movement wasn't part of the discussion. I don't know that there was a deliberate decision by the team that was doing the briefings. I believe they were still in the mode from the previous evening where they were pushing back against an assumption that we either were responsible for hitting the pedestrian or that we did not react fast enough when the pedestrian fell into our path. But as I've probed for basic information about what we shared and when I've had the same frustration that dates get pushed together or details are left out. I don't know if this is deliberate, or people are simply having

difficulty recalling exactly what they did or said during the immediate aftermath of that event.

Both of these Slacks convey that the three senior leaders of the company – the CEO, CLO, and COO – were not actively engaged in the regulatory response for the worst accident in Cruise's history. Instead, they were trying to piece together what happened after the fact.

Nonetheless, based on Quinn Emanuel's review to date, the evidence does not establish that any Cruise employee intended to mislead the regulators about the pullover maneuver and pedestrian dragging. Rather, the failure to discuss those facts was the product of leadership failures and mistakes in judgment, particularly the flawed approach of relying on the Full Video to disclose all material facts.

E. Cruise's Disclosures to the SF MTA, SF Fire Department, and SF Police Department

The final meeting Cruise had on October 3 with government officials was with the SF MTA, SFPD, and SFFD. Cruise employees did not hold a pre-meeting to prepare for the SF MTA, SFPD, and SFFD meeting. Nonetheless, Cruise team members discussed in Slack messages whether to play video at the meeting. Senior leaders from Cruise's government affairs team also raised concerns about sharing video with the SF MTA, which they perceived to be Cruise's frequent public adversary, out of concerns the SF MTA would leak information to the media. SVP of Government Affairs Estrada noted the SF MTA official was "only capable of looking for fault on us." But others from that team argued that Cruise should show the Full Video, which they subsequently did in the meeting. At the time these employees made that argument, however, they had not seen the Full Video and thus were not aware it depicted the pedestrian being dragged.

The Cruise team also updated their internal running notes for SFFD meetings to include the Accident as one of six topics of discussion for the meeting. The agenda included a link to the

Google Map of where the Accident occurred, a link to the Full Video to be played at the meeting, and a reference to "Pics of Panini." Because the SFFD had incorrectly stated that the Cruise AV caused the Accident, the Cruise team planned to discuss the process for public statements.[54]

The Cruise team also planned to discuss during the meeting reports that an SFPD official had told a Cruise employee that morning that "while recognizing the investigation is ongoing, [Cruise's] involvement was secondary or incidental." The agenda for the meeting did not include any mention of the pullover maneuver or dragging.

The virtual meeting started at 3:30 p.m. and was attended by four Cruise employees from government affairs, markets, and systems integrity, and four officials from SF MTA, SFPD, and SFFD. The meeting started with brief introductions, after which Cruise's Director of Global Government Affairs asked Wood to play the Full Video, which he did without any technical issues.

After watching the video, an SFFD official asked if the car came to a stop and then moved further before coming to a final stop. The official asked for the video to be played again, and it was played as many as half a dozen times. A government official asked: "this car moves with the woman underneath it, is that what we are seeing?" Cruise responded affirmatively. The government officials then asked a series of questions regarding the movement. Wood reportedly explained that the car was initiating a pullover maneuver attempting to achieve a minimal risk condition. After hearing this response, interviewees said the government officials asked Cruise again: "so the vehicle comes to a stop and continues driving?" Once again, a Cruise employee responded: "yes." An SF MTA official recognized and "called out the secondary motion."

[54] Here, Cruise had disagreed with the statement that SFFD released at 7:30 a.m. on October 3, which did not mention there was another vehicle, the hit-and-run driver, and stated only that SFFD had rescued a pedestrian from beneath an autonomous vehicle using heavy rescue tools to lift the vehicle.

Of the four Cruise meeting attendees, two said they had never seen the Full Video before their meeting with the SF MTA, SFFD, and SFPD.[55]

When watching the video for the first time during this 3:30 p.m. meeting with officials, a Cruise employee was surprised when, as the video was being played, the AV started moving again, stating that the pullover maneuver "was very obvious" when you are watching it. The employee had the reaction: "what the hell, why is the car moving again, as it's not a small action you don't notice. There's a person under there." The employee recalled not seeing the "dragging" but the car stopping and moving again "jumped out." Another Cruise employee, watching the Full Video for the first time and who did not know of the pullover maneuver or dragging, described seeing the car moving again as a "jolt of lightning."

The October 3 meeting, in sum, resulted in Cruise showing the SF MTA, SFFD, and SFPD the Full Video, including the pullover maneuver and pedestrian dragging, more than once and then responding to questions from government officials about those facts. From the playing of the Full Video without interruption, the AV's pullover maneuver and pedestrian dragging was depicted clearly enough that at least the Cruise attendees at that meeting seeing it for the first time could understand that the pedestrian had been dragged from watching the video alone.

F. Cruise's Disclosures to the California Public Utilities Commission (CPUC)

1. Cruise's October 3 Communications with the CPUC

On October 3, at 12:46 a.m., Cruise Government Affairs Senior Manager Jose Alvarado sent a text message to CPUC Analyst Ashlyn Kong to notify the CPUC of "an incident last night."

[55] Indicative of team siloing within Cruise, other members of Cruise's government affairs team attended regulatory meetings earlier that day, as well as an internal DMV debrief meeting with Vogt before 3:30 p.m., but did not provide any debrief of those meetings or mention the AV's pullover maneuver to their two team members who were about to present on the same topic to the SF MTA, SFFD, and SFPD.

His message said Cruise was "still gathering all the facts" about the Accident, and that he would call in the morning to provide additional information. At the time, Alvarado served as Cruise's primary point of contact with the CPUC. Kong sent Alvarado a text message reply later that morning, at 7:55 a.m., stating: "Thank you for letting me know. Please call me whenever it's a good time to talk."

Alvarado called Kong at approximately 12:30 p.m. after a plane flight to discuss the Accident. During their call, Alvarado used the pre-approved Accident talking points that Cruise's government affairs had provided. Consistent with those talking points, Alvarado did not mention that the AV had engaged in a pullover maneuver after initial impact, or that the AV had dragged the pedestrian. According to Alvarado, during his call with Kong, he offered to play the Full Video (the 45-second video) of the Accident for Kong and he warned Kong that the video content could be difficult to watch. Alvarado said Kong declined his offer to watch the video. Instead, Kong's questions during the call were focused on passenger safety and, specifically, whether a passenger was in the AV at the time of the Accident. Alvarado responded that there was not and also offered to provide the CPUC with further information as requested.

Contrary to Alvarado's recollection, Kong recalls that Alvarado did not offer to share a video. *See* Section IV.C. However, Alvarado's recollection that he did offer to share the Full Video has some corroboration in Cruise's internal communications that were exchanged before any dispute arose between the CPUC and Cruise.

For example, on October 24, 2023, at 9:51 a.m., on a Cruise Slack thread, Raman asked Alvarado: "did we proactively share the video to CPUC?? I don't remember that." Alvarado replied: "No, we didn't share, but we did offer. A formal request came soon after for the video and information on the incident." In addition, on October 10, 2023, at 7:32 p.m., on a Cruise

Google Docs comment page, a Cruise lawyer stated: "Need to confirm we screen-shared with the CPUC." Raman responded: "we offered but did not screen share as [the CPUC Analyst] did not request."

2. CPUC's October 5 Data Request

Quinn Emanuel is aware of no further communications between Alvarado and Kong from October 3 to October 5. On October 5, the CPUC Transportation Enforcement Branch ("TEB") issued Cruise a data request seeking information about the Accident, including any video footage. The TEB provided Cruise 14 days – until October 19, 2023 – to respond to its request. Responding to data requests on the specified due date was Cruise's standard practice, and thus it provided its response to the TEB on October 19, as had been requested. As far as can be determined, apart from Alvarado's offer to show the Full Video on October 3, no Cruise employee had any substantive discussion with the CPUC about the Accident between October 3 and 19.

3. Cruise's October 19 Response to CPUC's Data Request

On October 19, Cruise submitted written responses to the TEB's data request,[56] along with a copy of the Full Video. Cruise's October 19 written responses included the following summary of the Accident:

> [T]he Nissan Sentra made contact with the pedestrian, deflecting the pedestrian in front of the AV. The AV biased rightward before braking aggressively but, shortly thereafter, made contact with the pedestrian. The AV then attempted to achieve a minimal risk condition (MRC) by pulling out of the lane before coming to its final

[56] On October 18, the Transportation Licensing and Analysis Branch ("TLAB") and Cruise held their regularly-scheduled monthly meeting, which was attended by both Kong and Alvarado. The Accident was not a specific agenda item and there is no indication that TLAB asked Cruise representatives about the pullover maneuver or the pedestrian being dragged. During the meeting, Alvarado did say that Cruise would be providing responses to the TEB data request, including a video, the next day.

stop position. The driver of the Nissan Sentra left the scene shortly after the collision.

Although Cruise's response to the TEB data request disclosed the pullover maneuver, it did not mention that the pedestrian was dragged underneath the vehicle as a result of that maneuver. However, the Full Video which Cruise provided to the CPUC as part of its response to the data request does depict the pedestrian dragging. As discussed below in Section IV.C, the CPUC subsequently issued an Order to Show Cause regarding Cruise's disclosures to the CPUC about the Accident.

4. Conclusions Regarding Cruise's Disclosures to the CPUC

Similar to its interactions with NHTSA and the DMV, the evidence reviewed to date does not establish that Cruise leadership or employees sought to intentionally mislead the CPUC regarding the details of the October 2 Accident. To the contrary, a Cruise employee stated that he offered to play the Full Video. However, Cruise's dealings with the CPUC still reflect the failure to understand the importance of providing regulators with all known material facts, whether asked for specifically or not, as well as the need to timely update regulators when additional or different facts are learned. Although Alvarado in the earliest hour of October 3 said he notified the CPUC that there had been an accident, and then followed up with a telephone call and an offer to share the Full Video with the CPUC at that time. In following the approved Cruise talking points on that call, Alvarado did not affirmatively raise or explain the pullover maneuver or that the pedestrian had been dragged.

Finally, although Cruise provided the CPUC with a copy of the Full Video on October 19 as part of its response to the TEB's data request, Cruise's written responses were incomplete in that they described the pullover maneuver but did not state that the pedestrian had been dragged

as a result. In addition to the transmission of the Full Video, Cruise also should have included the fact of the dragging in its written responses.

G. Cruise's Disclosures to Other Federal Officials

After the October 2 Accident, Cruise's government affairs and communications teams also reached out to various federal officials on Capitol Hill as well as individuals in local government, lobbyists, trade representatives, and other international and private authorities and parties, to inform them of the October 2 Accident and offer to answer any questions they might have. This initial outreach was focused on communicating that the Accident had been caused by a hit-and-run driver, and not the Cruise AV, in an effort to correct the erroneous media statements running at that time. As part of this effort, Cruise enlisted its consultants to assist in its outreach on Capitol Hill and with others. The immediate outreach primarily consisted of emails and forwarding Cruise's press statement or social media message at the time.

Subsequently, following the DMV Suspension on October 24, Cruise notified its government contacts on Capitol Hill of the suspension, and provided an update on Cruise's decision to pause operations of driverless vehicles in San Francisco and the status of its commercial operations in Arizona and Texas. Cruise's outreach focused on conveying the message that it believed it had worked closely with regulatory agencies such as the California DMV, CPUC, and NHTSA following the October 2 Accident.

IV. THE AFTERMATH OF THE OCTOBER 2 ACCIDENT

The fallout from the October 2 Accident has been significant.

A. The Cruise License Suspension by the DMV in California

When the DMV suspended Cruise's robotaxi permit on October 24, it did so "effective immediately." As a result, since October 24 Cruise is no longer permitted to pick up and drop off passengers in driverless vehicles until Cruise first satisfies the DMV's requirements, discussed

above in Section III.D.10. Under the terms of the suspension, Cruise can still test its vehicles with human safety drivers behind the wheel, but operations of driverless AVs in San Francisco are no longer permitted until the suspension is lifted and its license is reinstated. As a result, Cruise's near-term expansion plans have been shelved until Cruise can restore credibility with the DMV.

B. The NHTSA PE Investigation and Safety Recall

After NHTSA opened its PE on October 16, as discussed above in Section III.C.5.c, Cruise voluntarily decided to pause its driverless operations and file a recall report for its 950 Automated Driving Systems units. Thus, on October 27, Cruise notified NHTSA in an email that:

> Cruise has decided to proactively pause driverless operations in all of our markets while we reflect on how we can better operate in a way that will earn public trust. This is not related to any new on-road incidents, and we will be continuing operations of our AVs in supervised mode. We think it's the right thing to do while remaining relentlessly focused on safety and continuous improvement, and taking steps to rebuild public trust.

A few days later, on November 2, Cruise submitted its Part 573 Defect and Noncompliance Report to NHTSA (the "Recall Report"). NHTSA posted it publicly on November 7. The Recall Report described the defect that led to Cruise's voluntary recall as follows:

> In certain circumstances, a collision may occur, after which the Collision Detection Subsystem may cause the Cruise AV to attempt to pull over out of traffic instead of remaining stationary when a pullover is not the desired post-collision response. This issue could occur after a collision with a pedestrian positioned low on the ground in the path of the AV.[57]

[57] Part 573 Safety Recall Report, NHTSA Recall No. 23E-086, (Nov. 7, 2023), at 2.

The Recall Report noted that:

> [t]his issue played a role in determining the Cruise AV's response to a collision on October 2, 2023. In the incident, a human-driven vehicle traveling adjacent to a Cruise AV collided with a pedestrian, propelling the pedestrian across their vehicle and onto the ground in the immediate path of the AV. The AV biased rightward and braked aggressively but still made contact with the pedestrian. The Cruise ADS inaccurately characterized the collision as a lateral collision and commanded the AV to attempt to pull over out of traffic, pulling the individual forward, rather than remaining stationary.

The Chronology portion of the Recall Report also summarized Cruise's regulatory interactions on October 3, noting that it met with DMV, NHTSA, and other San Francisco officials to discuss the Accident, and reached out to the CPUC, as well as reported the Accident in its 1-Day Report to NHTSA.[58] In the Recall Report, Cruise stated it developed a software update that would have enabled the Cruise AV to "have remained stationary during the October 2 incident." Cruise stated further that it "will deploy the remedy to its driverless fleet prior to resuming driverless operations."

As a result of the recall, 950 ADS units were recalled, meaning Cruise paused driverless operations in all of its markets, "providing the company time to further assess and address the underlying risk." As of the date of this Report, this pause remains in effect while Cruise takes the necessary actions to improve and restore regulatory trust.

C. The CPUC's "Show Cause Ruling"

On December 1, 2023, the CPUC issued an Order to Show Cause ("OSC") requiring Cruise to address issues related to Cruise's interactions with the CPUC in the aftermath of the Accident.

[58] Part 573 Safety Recall Report, NHTSA Recall No. 23E-086, (Nov. 7, 2023), at 3.

Specifically, the CPUC ordered Cruise to show cause why it should not be sanctioned for allegedly "failing to provide complete information to the [CPUC]" regarding the incident, and for allegedly "making misleading public comments regarding its interactions with the [CPUC]." OSC, at 1. Attached to the OSC are the sworn declarations of Ashlyn Kong and a second CPUC employee.

In the OSC, the CPUC states that when Cruise's employee Jose Alvarado called CPUC Analyst Ashlyn Kong on October 3, he "omitted that the Cruise AV had engaged in the pullover maneuver which resulted in the pedestrian being dragged an additional 20 feet at 7 mph." OSC, at 4. The Kong Declaration also states that during that call: "Alvarado did not show, or offer to share any video footage of the collision."[59] OSC, Kong Decl., at ¶ 8.

The OSC states further that Cruise failed to provide the CPUC with a "full account" of the Accident until October 19. Finally, the OSC claims that the October 24, 2023 blog post referenced above was misleading by stating that Cruise "proactively shared information" with regulators, including the CPUC, when "in fact, it withheld information from the [CPUC] for 15 days," and because Cruise had failed to disclose to both the DMV and the CPUC "information about the extent of the Cruise AV interaction with the pedestrian." OSC at 5-6.

The OSC ordered Cruise to file with the CPUC a verified statement addressing issues raised in the OSC and to appear at an evidentiary hearing before the CPUC on February 6, 2024.

On January 5, 2024, Cruise filed with the CPUC a Motion for Alternative Dispute Resolution and Deferral of the OSC Proceedings, seeking an opportunity to resolve the issues raised in the OSC through the CPUC's ADR Program and a deferral of the OSC proceedings to

[59] As noted above, the Cruise employee's statement that he offered to show Kong the Full Video of the Accident during their October 3 call has corroboration in internal Cruise communications.

allow time for ADR.[60] Also on January 5, Cruise filed with the CPUC an Offer of Settlement which included an offer to pay $75,000 to the State (California) General Fund and to adopt new data reporting enhancements for providing the CPUC with information about collisions and minimal risk conditions.[61]

On January 12, 2024, the CPUC issued a Ruling on Cruise's motion for ADR and to defer the OSC proceedings.[62] In that ruling, the Administrative Law Judge denied Cruise's request for ADR, postponed the OSC Proceedings (both the verified statement filing and the evidentiary hearing), and ordered Cruise: (i) to file, by January 30, 2024, a motion for approval of the settlement, with a copy of the proposed settlement agreement and Quinn Emanuel's Report attached; and (ii) to appear before the CPUC on February 6, 2024 to answer questions about the settlement agreement, and to produce a witness with personal knowledge of this Report.

D. New Senior Management of Cruise and the Downsizing of Cruise

As part of its commitment to "undertaking significant process improvements with respect to its interactions with regulators," Cruise is taking steps to bring in new leadership and remove senior leaders in the legal, regulatory, and communications teams involved with the October 3 and other regulatory disclosures about the Accident. A total of 11 Cruise employees involved directly or indirectly with the briefings to government regulators have departed Cruise. In addition, on December 14, Cruise announced an overall 24% Reduction in Force. As a result, additional Cruise

[60] Cruise LLC's Motion for Alternative Dispute Resolution and Deferral of the Order to Show Cause Proceedings, R.12-12-011 (Jan. 5, 2024), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M522/K814/522814400.PDF.

[61] Attachment A (Cruise LLC's Offer of Settlement), R.12-12-011 (Jan. 5, 2024), https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M522/K814/522814400.PDF.

[62] Administrative Law Judge's Ruling on Motion of Cruise LLC for Alternative Dispute Resolution and Deferral of the Order to Show Cause Proceedings, R. 12-12-011 (Jan. 12, 2024). https://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M523/K255/523255345.PDF.

personnel who were involved with Cruise's response to the October 2 Accident are no longer with the Company.

V. SUMMARY OF FINDINGS AND CONCLUSIONS

Based upon Quinn Emanuel's review to date, and cognizant of the limitations discussed above, the Report sets forth the following Findings and Conclusions.

First: *By the time Cruise employees from legal, government affairs, operations, and systems integrity met with regulators and other government officials on October 3, they knew or should have known that the Cruise AV had engaged in a pullover maneuver and dragged the pedestrian underneath the vehicle for approximately 20 feet.* This information was communicated on Slack messages as early as 3:45 a.m. on October 3, and was further amplified to the Cruise War Room in another engineering Slack message at 6:56 a.m. It also was discussed in two leadership meetings at 6:00 a.m. and 6:45 a.m. collectively attended by 109 individuals, as well as employees in five conference rooms. These meetings all occurred prior to the meeting with the Mayor's Office at 10:05 a.m., the NHTSA meeting at 10:30 a.m., and the DMV meeting at 11:30 a.m. Notes of a pre-meeting that Cruise employees held before the NHTSA meeting further confirm that various Cruise employees understood that the pullover maneuver and pedestrian dragging had occurred and was "the biggest issue."

Yet, Cruise's employees—including certain senior Cruise leaders—mistakenly relied on playing the Full Video to disclose these facts to regulatory and governmental officials on October 3, and in subsequent meetings in mid-October. Playing the Full Video to let "the video speak for itself," and then waiting to respond to any questions regulators raised, was a fundamentally flawed approach. Those questions never came in the meetings with NHTSA, the DMV, or the Mayor's Office, likely due to internet connectivity issues.

The only meeting in which any discussion of the pullover maneuver and dragging occurred was in Cruise's 3:30 p.m. meeting with SF MTA, SFPD, and SFFD. Although Cruise employees again did not raise the pullover maneuver and pedestrian dragging, they were able to play the Full Video without internet connectivity issues several times. City officials were thus able to see the vehicle movement and dragging for themselves and ask questions. Cruise's passive, non-transparent approach to its disclosure obligations to its regulators reflects a basic misunderstanding of what regulatory authorities need to know and when they need to know it.

Second: *Although neither Cruise nor Quinn Emanuel can definitively establish that NHTSA or DMV were shown the entirety of the Full Video, including the pullover maneuver and dragging, the weight of the evidence indicates that Cruise attempted to play the Full Video in these meetings; however, internet connectivity issues impeded or prevented these regulators from seeing the video clearly or fully*. In addition, in the face of these internet connectivity issues that caused the video to freeze or black- or white-out, Cruise employees remained silent, failing to ensure that the regulators understood what they likely could not see – that the Cruise AV had moved forward again after the initial impact, dragging the pedestrian underneath the vehicle. As a result, the DMV's contention that "Cruise did not disclose that any additional movement of the vehicle had occurred after the initial stop of the vehicle" is not without justification. In any case, whether regulators actually saw or appreciated the Full Video is beside the point, as Cruise indisputably should have affirmatively discussed and explained the pullover maneuver and dragging in each of its October 3 meetings.

Third: *Even if, as some Cruise employees stated, they were unaware of the pullover maneuver and pedestrian dragging at the time of certain regulatory briefings (which itself raises other concerns), Cruise leadership and other personnel were informed about the full details of the*

October 2 Accident during the day on October 3 and should have taken corrective action. During the 12:05 p.m. CMT and 12:40 p.m. SLT meetings, respectively, Cruise engineers and safety personnel presented their detailed engineering analysis and showed a graphical chart demonstrating the pullover maneuver and pedestrian dragging. These meetings included the CEO, COO, the VP and Deputy Counsel for Regulatory & Compliance, and the VP of Global Government Affairs. These government affairs employees should have contacted NHTSA and the DMV after the earlier meetings that day to update regulators about these engineering findings and make clear that the AV had moved forward, dragging the pedestrian for approximately 20 feet. Their failure to do so was due in large measure to leadership failings, mistakes of judgment, a lack of coordination within Cruise, and the myopic focus of Cruise leadership on rebutting the media narrative that the AV had caused the Accident.

Notably, the internet connectivity issues and lack of questioning from the DMV or NHTSA regulators about the dragging should have caused, and in some instances did cause, concern among certain Cruise employees at the time as to whether the regulators appreciated the full facts. Yet, no one within Cruise took any affirmative, much less corrective, action to address this risk. Moreover, although Cruise employees relied on their uploading of the Full Video to NHTSA shortly after their meeting on October 3, they did not produce and upload the Full Video to the DMV until ten days later. In any case, sharing a video does not relieve Cruise of the need to timely apprise regulators of material facts.

Fourth: *While Cruise employees clearly demonstrated mistakes of judgment and failure to appreciate the importance of transparency and accountability, based on Quinn Emanuel's review to date, the evidence does not establish that Cruise employees sought to intentionally mislead government regulators about the October 2 Accident, including the pullover maneuver and*

pedestrian dragging. To the contrary, Cruise employees attempted to play the Full Video depicting these facts in good faith but were repeatedly impeded by technical glitches. There is some evidence that two senior employees were relieved that DMV had not noticed the pedestrian dragging during the October 3 meeting, but this belief does not establish intent to deceive in the first instance. Moreover, it is implausible that Cruise and its employees would upload and provide the Full Video that same day to one regulatory agency (NHTSA) while seeking to conceal it from another (DMV). In addition, Cruise's evidence indicates that Cruise offered the Full Video to the CPUC on October 3, which declined the offer. And Cruise employees played the Full Video without technical issues to the SF MTA, SFPD, and SFFD, and discussed the pullover maneuver and its impact upon the pedestrian with them, thereby increasing the likelihood that the pullover maneuver and pedestrian dragging would be discussed among the various regulatory agencies. In fact, the DMV's Suspension Order itself expressly states that: "The department [DMV] only learned of the AV's subsequent movement via discussion with another government agency." This conduct is difficult to reconcile with any intent or plan by Cruise employees and leadership to conceal and mislead regulatory agencies.

Fifth: *Cruise's senior leadership repeatedly failed to understand the importance of public trust and accountability.* As a result, they thought it was acceptable to continue to transmit inaccurate background points and show the media—well into the afternoon of October 3—an incomplete video that did not depict the pullover maneuver and pedestrian dragging even after obtaining the Full Video by 6:28 a.m., earlier that morning. While it was important to correct the initial media narrative that incorrectly blamed the Cruise AV for the Accident and omitted the Nissan altogether, they allowed this reasonable concern to overtake everything else, including the disclosure of other material aspects of the Accident. Members of Cruise's senior leadership also

repeatedly articulated through their words and actions that Cruise has less of an obligation to be transparent to the media than to regulators. Even if this is true in the abstract (government can require more than the media), Cruise leadership failed to appreciate that by disseminating partial information about the Accident well after they were aware of the pullover maneuver and pedestrian dragging, Cruise allowed the media to believe that the *only* information of any public import was that the Nissan, not the Cruise AV, caused the collision. This was untrue and inappropriate, and has triggered legitimate criticisms from media outlets that Cruise misled them about the full details of the Accident. Revamping the Cruise communications leadership, as Cruise already has started to do, will be imperative to restoring trust in Cruise's brand and public statements.

Finally: *Cruise's response to the October 2 Accident reflects deficient leadership at the highest levels of the Company—including among some members of the C-Suite, legal, governmental affairs, systems integrity, and communications teams—that led to a lack of coordination, mistakes of judgment, misapprehension of regulatory requirements and expectations, and inconsistent disclosures and discussions of material facts at critical meetings with regulators and other government officials. The end result has been a profound loss of public and governmental trust and a suspension of Cruise's business in California.*

For example:

- *There was no captain of the ship*. No single person or team within Cruise appears to have taken responsibility to ensure a coordinated and fully transparent disclosure of all material facts regarding the October 2 Accident to the DMV, NHTSA, and other governmental officials. Various members of the SLT who had the responsibility for managing the response to this Accident were missing-in-action for key meetings, both preparatory and/or with the regulators. This left each Cruise

team to prepare for the meetings independently, with different employees attending different regulatory meetings, and with no senior Cruise official providing overall direction to ensure consistency in approach and disclosure of all material facts.

- *There was no demonstrated understanding of regulatory expectations by certain senior Cruise management or line employees.* Regulators and government officials involved in enforcing laws and regulations designed to protect human safety want and need to know all material facts about an accident involving a regulated product. Cruise simply relied on playing the Full Video to provide critical information to regulators, and then awaited their questions, rather than proactively raising and discussing the pullover maneuver and dragging. This led the DMV in its Suspension Order to state that "Cruise's omission hinders the ability of the department to effectively and timely evaluate the safe operation of Cruise's vehicles and puts the safety of the public at risk."[63]
- *Cruise's deficient regulatory response to the October 2 Accident reflects pre-existing weaknesses in the Company, including ineffectual Cruise leadership with respect to certain senior leaders.* Two out of many examples illustrate these weaknesses.

► First, there does not appear to have been a coordinated and rigorous approval process for talking points regarding what facts about the October 2 Accident needed to be discussed with the DMV, NHTSA, and other governmental officials. Nor did Cruise leadership or employees involved in the briefings with government officials take steps to ensure that they knew all the material facts *before* these meetings, including asking

[63] DMV Suspension Order, (Oct. 24, 2023), at 2.

their direct reports for any updates. Notably, several Cruise employees said they had not even seen the Full Video prior to briefing government officials and thus only learned of the pullover maneuver and pedestrian dragging alongside these government officials when the Full Video was shown. In addition, the CLO and the VP of Global Government Affairs went into briefings with government officials without knowing of the pullover maneuver or dragging. To underscore Cruise's lack of coordination in its briefings to regulators and other government officials on October 3, senior leadership never convened a meeting of the various teams to discuss and learn how these meetings went, what questions were asked, and what discussions took place. Had they done so, they should have realized that in only one of the four meetings did government officials ask questions about the pullover maneuver and pedestrian dragging, requiring corrective action.

- Second, although NHTSA requires the filing of 1-Day, 10-Day, and 30-Day Reports about an accident, Cruise lawyers displayed a lack of understanding of what information must be communicated to NHTSA in these reports, and misapprehended the NHTSA requirement that reports should address "a written description of the pre-crash, crash, and post-crash details…." In addition, Cruise leadership gave a paralegal the primary responsibility for preparing and filing such reports with the Cruise legal department exercising little oversight. As a result, neither the 1-Day nor 10-Day NHTSA reports disclosed the pullover maneuver and dragging. Only the 30-Day Report acknowledged these facts.

Regarding the leadership issues Quinn Emanuel uncovered during its review, certain senior lawyers and government affairs employees should have been responsible for and taken the lead in preparing for and presenting the facts in Cruise's October 3 meetings with the DMV, NHTSA, and

other government officials. And yet, they relied upon an engineer, Matt Wood, to play the Full Video and then collectively awaited the regulator's questions. His internet connectivity problems prevented him from fulfilling that task, and should have been corrected sooner or the responsibility passed to another Cruise employee. But responsibility for disclosing all facts and information should rest principally with Cruise's senior lawyers and government affairs employees, not with an engineer like Wood, who is not a lawyer or regulatory expert trained in regulatory compliance under the law. Engineers like Wood can provide invaluable assistance by providing technical engineering information and explanations to regulators; but the need to fulfill regulatory disclosure requirements and expectations should rest with those trained to perform those functions.

In short, while the evidence shows Cruise's intent was to disclose the material facts to government regulators and officials on October 3 by playing the Full Video, Cruise failed to do so as a result of a series of missteps and poor decisions. This has led not only to strained relations with Cruise's key regulatory bodies but also to a suspension of its operations.

VI. RECOMMENDATIONS

During the course of Quinn Emanuel's review, Quinn Emanuel has made various recommendations to the Cruise and GM Boards based upon the evidence. Several of these, such as the need to evaluate the effectiveness of Cruise's existing senior leadership, have already been undertaken, resulting in the departure of much of Cruise's senior leadership team, effective December 14.

This Report also sets forth several more Recommendations for consideration. These are designed to identify steps Cruise should consider in order to ensure regulatory compliance, restore credibility and improve Cruise's relationship with its regulators and other government officials, the general public and the media.

First—Organizational Changes And Culture: *It is imperative that Cruise immediately take affirmative steps to restore its credibility and trust with its regulators.*

► The tone at the top matters. As Cruise brings in some new senior leaders, it should ensure that the entire management team understands and embraces full transparency, accountability, and a collaborative relationship with government officials and public stakeholders. If the senior leadership of Cruise is both externally and internally committed to proactively working to comply with regulatory requirements and expectations, then the rest of the Cruise organization should understand that message and follow. However, any recalcitrant employee, no matter how senior, should promptly be removed from the Cruise organization.

► Cruise should consider creating a small, dedicated, cross-disciplinary Regulatory Team comprised of government affairs, legal, communications, engineering, and safety personnel who are responsible for ensuring regulatory compliance, reporting accuracy, and complete transparency in all government interactions. This new cross-disciplinary Regulatory Team should (i) understand the governing regulations, (ii) have significant experience in dealing with regulators, particularly those charged with safeguarding public safety in the transportation field, and (iii) work proactively to improve Cruise's regulatory reporting processes and systems. This Regulatory Team should report directly to the CEO with Board oversight.

Second—Training And Continuous Improvement: *There is an immediate need to train the remaining senior Cruise leadership and Cruise's new management about the applicable regulatory requirements and how best to comply with and satisfy regulators' expectations, and to*

reinforce that education with regular, periodic training. During interviews and review of documents, Quinn Emanuel observed too much of an 'us versus them' attitude among certain Cruise employees regarding their regulators and other governmental officials, which is not indicative of a healthy, mutually productive relationship. Cruise should approach its regulators and government officials as partners committed to improving transportation health and safety, not as impediments or adversaries to a growing business. This is particularly important given the remote nature of the Cruise work environment in which many Cruise employees come to Cruise facilities only several times a month. New and existing employees should be trained on Cruise's new corporate culture and the imperative to work cooperatively with regulators, even where there might be topics of legitimate disagreement.

Third—Leadership: *Cruise's leadership and management of crises needs to be revamped*. Cruise's response to the worst accident in its history was deficient in many respects. In a crisis, by definition, there needs to be a "Captain" or someone in charge. Over 200 employees in a War Room cannot effectively manage a crisis. Nor can Cruise safeguard its brand or preserve public and regulatory trust when many of Cruise's leaders in the SLT with responsibilities for managing the crisis and providing information to regulators and other government officials—including its CEO, COO, and CLO—were disengaged and/or failed to apprehend that the government, the media, and the general public must receive full and complete information about an accident resulting in injury. Not only was the Crisis Management Team assembled to address the October 2 Accident too large, amorphous and disempowered to marshal an effective and coordinated response, but Cruise's CEO and COO inexplicably disbanded it less than 24 hours after the Accident occurred when Cruise's response to the burgeoning crisis was still ongoing. Moreover, it simply should not be the case that, after two regulatory agencies initiated adverse

actions against Cruise, Cruise's CEO could claim that "during the handling of the event I remember getting inconsistent reports as to what was shared." Even if true, that statement underscores the need for new, informed and proactive leadership who understand how to lead.

In addition to hiring a new senior management team, Cruise should reconstitute and streamline its Crisis Management Team to direct a small group of cross-disciplinary personnel empowered to proactively manage a crisis, get to the bottom of an issue or accident, ensure that employees communicating with government officials and/or the media are fully briefed on and convey the most up-to-date information available, and execute needed action items quickly and effectively. And, of course, any CMT convened to respond to a crisis should remain in place until that crisis is fully resolved. Only through a dramatic overhaul of its leadership structure and personnel will Cruise be equipped to meet any future crisis that comes its way and achieve its mission of making AVs "better than human."

Fourth—Process Improvements: *Cruise should review and revise its Incident Response Protocol ("Protocol").* Given that Cruise employees acknowledged they did not adhere to the existing Response Protocol in certain respects, Cruise should review and revise that Protocol to ensure that best practices are being used, and that the Response Protocol is followed. Three missed opportunities highlight the need for reform in Cruise's Incident Response. In each of these examples, Cruise failed to access all available information that could have guided its understanding of the Accident and provided important information to help shape its response to the media, regulators, and other government officials.

First, the Full Video was available at 2:14 a.m. on the morning of October 3, yet it was not posted to the War Room Slack Channel until 6:28 a.m. This is because while the Cruise AV

automatically labeled the download of the Accident a "high priority," Cruise employees waited until the entire video feed was downloaded from the AV (which included other incidents) and were not aware that video of just the October 2 Accident was available earlier.

Second, Cruise did not obtain key information from eye witnesses at the accident scene. While it is clear that some information about the pullover maneuver and dragging was apparent to the contractor who took the 100 photographs and video of the accident scene on the night of October 2, there does not appear to have been a timely feedback loop to Cruise leadership so that this information could be immediately assessed and incorporated into Cruise leadership's understanding of the Accident.

Third, there is no indication Cruise spoke with the Remote Assistance contractors who were interacting with the AV until an internal, post-collision review weeks later; two of these contractors are recorded in interview notes as stating that the vehicle moved after initial impact, and one could "see and hear bumps" as that was happening. Although Quinn Emanuel was unable to interview these contractors to verify the accuracy of these statements, Remote Assistance operators have the initial visibility into Cruise accidents and are a valuable resource that Cruise should contact in order to piece together all of the facts.

Finally, given the importance of understanding the full details of an accident as quickly as possible, Cruise should consider utilizing investigators or former law enforcement personnel on its Incident Response team to help quickly gather and distill facts in a comprehensive and accurate manner. These individuals should be Cruise employees, and not contractors, to ensure proper oversight, training, and accountability.

Fifth—Group Functional Improvements: *There is a need to reform the governmental affairs, legal, and public communications functions within Cruise.* Cruise should consider

enhancing the teams with the expertise of former high-level officials from federal and state government adept at interacting with regulatory bodies. In addition, there needs to be education, training, and the development of processes to be rigorously followed in the event of another accident or issues with the AV technology. More importantly, each of these groups needs to have leadership who understand Cruise's regulatory obligations and the need for full and timely disclosure to regulators and the media of all material facts regarding any accident, particularly one involving an injury or death. These groups should support the proposed new Regulatory Team in fulfilling its responsibility.

Last—Reporting Approvals: *Going forward, Cruise should file its reports about any accident involving a Cruise vehicle with regulators by having a designated Chief Safety Officer or senior engineer, as well as a regulatory lawyer, within Cruise review and approve the filing of each report.* Following this practice will create the necessary incentives within Cruise's senior leadership to ensure that all such regulatory reports are accurate, timely, and contain all material facts known as of the time of filing. In addition, Cruise should file in a timely manner amended reports about any accident as it learns of additional material facts so that regulators can be kept fully informed by Cruise of all such facts as they are learned.

* * * * *

The tragic Accident of October 2 would never have occurred but for a human hit-and-run driver. But that is only part of the story, as the AV's pullover maneuver unfortunately dragged the already injured pedestrian another 20 feet. Then, due to poor leadership and mistakes of judgment, Cruise focused on rebutting erroneous media stories as to the Accident's cause, rather than also ensuring the communication of material facts to its regulators and other government officials, the media, and the public. These mistakes made matters worse—ultimately to the detriment of Cruise.

Cruise operates in a heavily regulated industry, where the relationship between the government regulator and regulated business depends upon transparency and trust, especially because of the overarching need to protect human safety. It thus is a fundamentally flawed approach for Cruise or any other business to take the position that a video of an accident involving an injured person provides all necessary information to regulators or otherwise relieves them of the need to affirmatively discuss and explain the material facts about an accident.

These Recommendations, in short, are intended to assist Cruise in improving its regulatory compliance so that it can become a model AV transportation company, setting the standard for transparency and accountability under the law, for the benefit of the public.

Appendix

January 24, 2024

quinn emanuel trial lawyers
quinn emanuel urquhart & sullivan, llp

Privileged and Confidential:

Protected by Attorney-Client Privilege

Cruise AV SF Incident—Pedestrian Collision (Exponent Project 2310645.000)

Technical Root Cause Analysis

Prepared by

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December 12, 2023

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Acronyms and Abbreviations

ABS	Anti-lock Braking System
ADS	Automated Driving Systems
AV	Autonomous Vehicle
[redacted]	[redacted]
DDT	Dynamic Driving Task
DDT-F	Dynamic Driving Task, Fallback
EV	Electric Vehicle
GPS	Global Positioning System
[redacted]	[redacted]
Lidar	Light Detection and Ranging
ODD	Operational Design Domain
[redacted]	[redacted]
MRC	Minimum Risk Condition
[redacted]	[redacted]
NHTSA	National Highway Traffic Safety Administration
ODD	Operational Design Domain
Radar	Radio Detection and Ranging
RCA	Root Cause Analysis
SGO	Standing General Order
[redacted]	[redacted]
TCS	Traction Control System
VIN	Vehicle Identification Number
VRU	Vulnerable Road User

Limitations

This report summarizes Exponent's work performed to-date as part of its independent, third-party technical root cause analysis of the incident that occurred on October 2, 2023, at approximately 9:29 PM PDT, and presents the findings resulting from that work. The findings presented herein are made to a reasonable degree of engineering and scientific certainty. Exponent relied upon information and data provided by Cruise to conduct its investigation and develop root cause and contributing factors assessments. Exponent cannot guarantee the accuracy or completeness of this source material; however, Exponent exercised usual and customary care in the conduct of these analyses represented in this document, including the assessment of source material provided by Cruise. Exponent reserves the right to supplement this report and to expand or modify findings and conclusions based on review of additional material as it becomes available through ongoing discovery, if any, and/or through any additional work or review of additional work performed by others. A review of Cruise's overall safety systems, culture, and technology is beyond the scope of this investigation.

Executive Summary

Exponent was retained by Cruise to perform an independent, third-party technical root cause analysis of the incident that occurred on October 2, 2023, at approximately 9:29 PM PDT. The incident occurred in the area of the intersection between Cyril Magnin Street, where it transitions to 5th Street, and Market Street in San Francisco, California. A Cruise autonomous vehicle (AV) named "Panini," operating in autonomous mode, was stopped at a red light at the intersection in the rightmost of two southbound driving lanes, and a Nissan Sentra (Nissan), operated by a human driver, was stopped in the adjacent lane to the left of the AV, traveling in the same direction. When the light turned green, both vehicles proceeded through the intersection, crossing Market Street. As the vehicles proceeded southbound through the intersection, a pedestrian traversed the opposite crosswalk from the southwest corner of the intersection traveling east, against a "*Do Not Walk*" pedestrian signal. The pedestrian proceeded through the AV's lane of travel (right lane), paused in the Nissan's lane of travel (left lane), and was subsequently struck by the Nissan. The Nissan's brake lights illuminated post-collision indicating that the Nissan hit the pedestrian without braking. The collision with the Nissan threw the pedestrian into the AV's lane of travel. The AV struck the pedestrian before coming to an initial stop, which lasted less than 0.1 s, and the AV then proceeded forward approximately 20 feet, dragging the pedestrian, before the AV stopped again at its final point of rest.

Exponent's investigation focused on identifying the technical root cause and the contributing factors relevant to the AV's overall behavior, responses, and actions during this incident, which first included an evaluation of the root cause of the AV-pedestrian collision and, second, the AV's post-collision response. Prior to Exponent's investigation, Cruise performed its own root cause analysis. As part of Exponent's investigation, Exponent reviewed Cruise's root cause analysis along with video and other data collected by the subject AV before, during, and after the incident; engineering and system documentation; vehicle maintenance records; the traffic collision report; the Standing General Order report provided by Cruise to the National Highway Traffic Safety Administration, as well as documentation and videos provided to government officials; and other relevant records and technical and scientific literature. Additionally, Exponent inspected the Panini vehicle, assessed the AV's recorded data of the event using Cruise's Webviz open-source data visualization tool, and met with Cruise engineers both in-person and remotely on numerous occasions. Exponent did not identify any evidence of reported vehicle, sensor, actuator, or computer hardware failures or software faults that could have contributed to the incident. The subject AV maintenance records did not show any persistent issues pertinent to the incident.

Leading up to the collision between the Nissan and pedestrian, the AV accurately detected, classified, and tracked both the pedestrian and the Nissan. As the Nissan approached the in-path pedestrian, who was first crossing and then paused in lane, the AV's predicted paths for the pedestrian and Nissan became consistent with a potential collision. The Nissan was traveling at a speed of approximately 21.7 mph when it struck the pedestrian without braking. At the same time as the collision between the Nissan and pedestrian, the AV was traveling at a speed of approximately 17.6 mph and was not predicting that either the Nissan or the pedestrian would enter the AV's travel path. The collision between the Nissan and pedestrian occurred approximately 2.9 s before the collision between the AV and the pedestrian.

Following the collision between the Nissan and the pedestrian, the pedestrian remained engaged with the Nissan for approximately 1.7 s, first at the vehicle hood and then tumbling to the roof. During this time, the Nissan moved left, crossing the centerline into the lane of oncoming traffic. Approximately 1.0 s after contact between the Nissan and the pedestrian, the Nissan moved right toward the AV travel lane. The pedestrian then separated from the Nissan approximately 1.17 s prior to the collision between the AV and the pedestrian. At this separation time, the AV was traveling at a speed of approximately 17.9 mph and was approximately one car length behind the Nissan in the adjacent right lane. The brake lights on the Nissan illuminated approximately 0.1 s after the Nissan struck the pedestrian. The AV was traveling at approximately 18.4 mph when the tumbling pedestrian was thrown at an unknown velocity and landed face down in the left region of the traffic lane occupied by the approaching AV, approximately 0.78 s prior to being struck by the AV. The Nissan came to rest at a small, clockwise angle relative to its lane of travel with the right front tire positioned near the white lane stripe.

As evidenced by the video and sensor data, the classification and tracking of the pedestrian became intermittent within 1.0 s after the initial contact between the pedestrian and the Nissan until the last correct object classification occurred at approximately 0.3 s prior to the collision between the AV and the pedestrian. This intermittent classification and tracking of the pedestrian led to an unknown object being detected but not accurately tracked by the automated driving system (ADS) of the AV and the AV detected occupied space in front of the AV. The ADS started sending steering and braking commands to the vehicle at approximately 0.25 s prior to the collision between the AV and the pedestrian due to the detection of occupied space in front of the AV. Consequently, just prior to the collision with the pedestrian, the AV's heading momentarily changed rightward, and the vehicle began decelerating. This deceleration resulted in a vehicle speed reduction from approximately 19.1 mph, prior to the onset of braking, to approximately 18.6 mph at the time of impact with the pedestrian. After the AV's front bumper first contacted the pedestrian, the ADS collision detection system detected a collision. In order to determine the location of

impact, the collision detection system refers to available object tracking information immediately prior to the detected impact. In the time immediately prior to impact, the pedestrian was substantially occluded from view of the lidar sensors, which facilitate object detection and tracking for the collision detection system. Only the pedestrian's raised leg, which was bent up and out toward the adjacent lane, was in view of these lidar sensors immediately prior to collision. Due to a lack of consistent detections in this time frame, the tracking information considered by the collision detection system did not reflect the actual position of the pedestrian. Consequently, the collision detection system incorrectly identified the pedestrian as being located on the side of the AV at the time of impact instead of in front of the AV and thus determined the collision to be a side impact. After contacting the pedestrian, the AV continued decelerating for approximately 1.78 s before coming to its initial stop with its bumper position located forward of the Nissan. The AV's left front wheel ran over the pedestrian and triggered an anti-lock braking system event approximately 0.23 s after the initial contact between the pedestrian and the AV's front bumper.

The determination by the ADS that a side collision occurred, and not a frontal collision, led to a less severe collision response being executed and resulted in the AV performing the subsequent outermost lane stop maneuver instead of an emergency stop. After coming to its initial stop, the AV began moving again, approximately 1.83 s after the initial contact between the pedestrian and the AV, to accomplish its outermost lane stopping maneuver. During this maneuver, the AV reached a speed of 7.7 mph and traveled approximately 20 feet while dragging the pedestrian before reaching its final rest position. The pedestrian's feet and lower legs were visible in the wide-angle left side camera view from the time of the collision between the pedestrian and the AV through to the final rest position of the AV. The ADS briefly detected the legs of the pedestrian while the pedestrian was under the vehicle, but neither the pedestrian nor the pedestrian's legs were classified or tracked by the ADS after the AV contacted the pedestrian. A traction control system event was recorded at approximately 3.8 s after the initial contact between the pedestrian and the AV due to the pedestrian physically resisting the motion of the vehicle. An accumulated offset between the wheel rotation of the left-rear wheel relative to the others from the wheel speed sensors led to the AV entering a degraded state approximately 5.8 s after the initial contact between the pedestrian and the AV. This degraded state caused the vehicle to initiate an immediate stop, and the vehicle reached its final point of rest approximately 8.8 s after the initial contact between the pedestrian and the AV.

The AV's collision with the pedestrian was caused by the pedestrian being projected in the AV's path of travel due to the collision with the Nissan. Calculations of potential AV stopping distance indicate that a collision of the AV with the pedestrian may not have been avoidable, even if the ADS had reacted to the

collision between the Nissan and the pedestrian. The AV's lack of anticipation of a potential future incursion of the pedestrian into its travel lane was a contributing factor to this incident. Reasonable human drivers would face challenges reacting to the pedestrian being projected into their lane of travel and would likely not have been able to avoid the collision under similar circumstances. This difficulty could be due to violations of expectancy, glare, or A-pillar obstruction, or a combination of these, as well as to a failure to predict the collision of the Nissan with the pedestrian in the adjacent lane and/or the resulting redirection of the pedestrian into their lane of travel. Moreover, reasonable human drivers would not likely have had adequate time to avoid the collision once the pedestrian was struck by the Nissan.

The root cause of the AV's post-collision movement, after the initial brief stop, was the inaccurate determination by the ADS that a side collision had occurred, which led to the triggering of an outermost lane stop maneuver instead of an emergency stop. Because all non-vehicles are treated in the same manner as a pedestrian with respect to a post-collision response, the intermittent classification of the pedestrian was not a contributing factor to the post-collision response. However, due to the inaccuracy of the object track considered by the collision detection system and the resulting disparity between this track and the pedestrian's actual position, the ADS failed to accurately determine the location of the pedestrian at the time of impact and while the pedestrian was underneath the vehicle. This contributed to the inaccurate side collision determination and the post-collision movement of the AV. When the AV came to an initial stop after the AV-pedestrian collision, the AV was already occupying the outermost lane and therefore, satisfied the location requirement for an outermost lane stop. However, the ADS did not consider this location as an acceptable stopping location because the outermost lane edge was mislabeled in the semantic map. This inaccurate determination by the ADS that it was not already in an acceptable stopping location was a contributing factor to the post-collision movement of the AV. After the AV contacted the pedestrian, an alert and attentive human driver would be aware that an impact of some sort had occurred and would not have continued driving without further investigating the situation.

1 Background

1.1 Incident Summary

Based on the information currently available, the subject incident occurred on October 2, 2023 at approximately 9:29 PM PDT[1] in the area of the Cyril Magnin Street and Market Street intersection in San Francisco, California (Figure 1 and Figure 2). Approaching the incident location from the north, Cyril Magnin Street intersected Market Street at a perpendicular orientation. South of the intersection, Cyril Magnin Street transitioned to 5th Street. Cyril Magnin Street/5th Street was a northwest to southeast oriented roadway that included two north and two southbound traffic lanes separated by a yellow painted centerline. In the area of the incident on southbound 5th Street, a dedicated bike lane separated from vehicle traffic by flexible vertical markers was available between the right through lane and adjacent curb. Vehicle travel was controlled by traffic signals located on each corner of the intersection. For pedestrians, signal-controlled crosswalks were also available. The speed limit for southbound traffic was 25 mph[2].

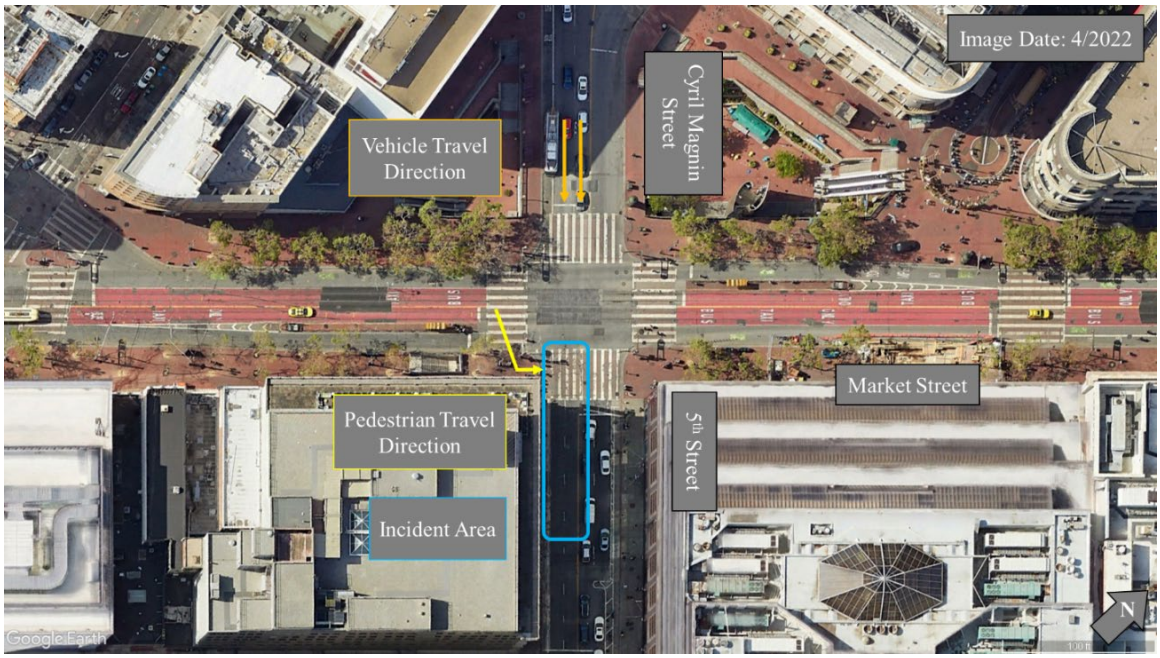

Figure 1. Annotated aerial image depicting incident area and generalized travel paths of the two vehicles and pedestrian. The image was rotated clockwise for clarity when referring to directionality.

[1] Incident Report (NHTSA Standing General Order), Report No. 30412-6395-2

[2] Incident Report (NHTSA Standing General Order), Report No. 30412-6395-2

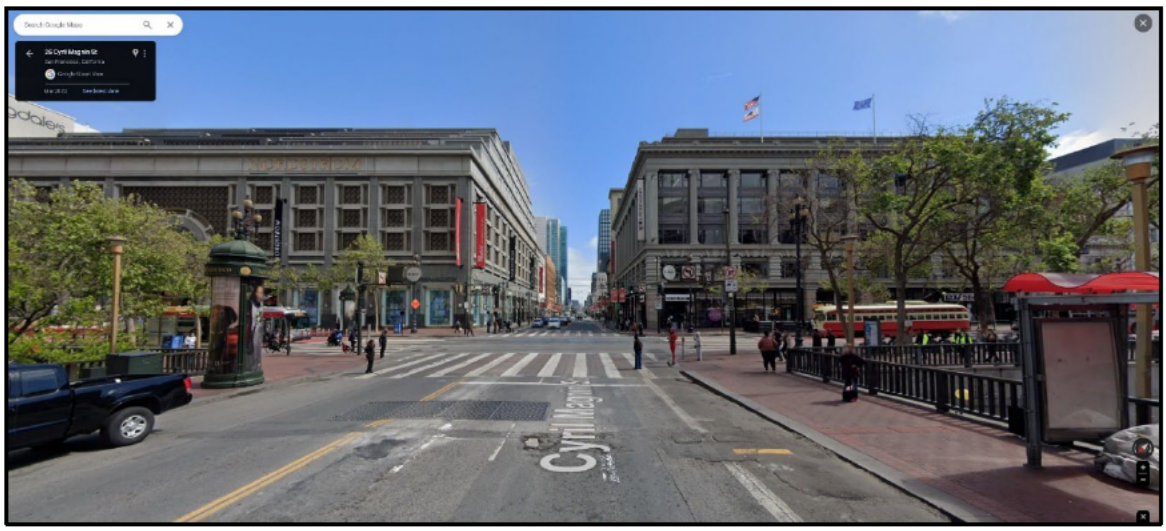

Figure 2. Street view image depicting approach to Market Street from the north and surrounding infrastructure.

The Cruise Autonomous Vehicle (AV) was equipped with an onboard sensor system capable of recording video in numerous directions surrounding the exterior of the vehicle. This footage was provided to Exponent for independent review and analysis, and it provided information regarding the accident sequence and vehicle environment. In addition to other currently available information, the video was considered in generating the following incident summary.

Immediately preceding the subject incident, the AV, operating in autonomous mode, was occupying the outside (right) through lane of southbound Cyril Magnin Street and was stopped for a red traffic signal near the stop bar at Market Street. At the same time and location, a human-driven Nissan Sentra (Nissan) was positioned adjacent to the AV, stopped in the inside (left) through lane. As the AV was stopped, a pedestrian traveled through the adjacent crosswalk (across Market St.) and paused at the 5th Street crosswalk. After the traffic signal turned green, both vehicles proceeded southbound while the pedestrian entered the 5th Street crosswalk and advanced to the east, against a "*Do Not Walk*" pedestrian signal. While in the crosswalk, the pedestrian paused and was struck by the front of the Nissan. During this interaction, the pedestrian was carried to the south with the Nissan before separating and being redirected, falling to the ground within the AV's travel lane. The AV struck the pedestrian before coming to a stop. From its initial point of rest, the AV then moved forward, dragging the pedestrian, before reaching its final point of rest. The AV's onboard video indicated that at the time of the incident, the roadway was dry and it was dark with lighting present in the area of the intersection. Other vehicle and pedestrian traffic was present in the area, as can be observed in the incident video.

1.2 Subject Vehicle Description

The Subject Vehicle is a model year 2023 Cruise AV (AV), which is small 4-door hatchback with an electric powertrain and is built on the Chevrolet Bolt electric vehicle (EV) platform. The AV bears the name "Panini", and the Vehicle Identification Number (VIN) is 5G21A6P0XP4143578. According to the VIN plate, the AV was manufactured in February 2023 (Figure 3). The Cruise Automated Driving System (ADS), with a [redacted] hardware version and d[redacted] software version, was added to the base Bolt EV platform.[3] A review of the National Highway Traffic Safety Administration's (NHTSA's) recall database showed that the Panini vehicle did not have any unrepaired recalls. At the time of the subject collision, the Bolt had approximately 5,091 miles on the odometer.[4]

Figure 3. Photographs showing the rear of AV (left), vehicle moniker label on left side C-pillar (top-right), and vehicle VIN sticker (bottom-right).[5]

Exponent performed a limited inspection of the AV. Photographs of the exterior of the vehicle can be found in Figure 4 below. During the inspection, the state of the vehicle was documented, and no visible structural damage was observed.

[3] Incident Report (NHTSA Standing General Order), Report No. 30412-6395-2

[4] Incident Report (NHTSA Standing General Order), Report No. 30412-6395-2

[5] Exponent Inspection of subject Cruise AV

Figure 4. Photographs of the outside of the AV.

Upon request, Cruise provided Exponent with the work order history of the AV. This included a total of 19 work orders starting on June 20, 2023 and ending on October 2, 2023. A review of the work orders and related documents indicated that there were no detected hardware or software faults that contributed to the incident.

The majority of the work orders related to work carried out in order to bring the vehicle into service and were not tied to any faults or issues with the base vehicle or ADS. On the morning of October 2, 2023, the morning of the incident, a work order was issued due to a request from the vehicle for recalibration of the right front camera.[6] The work order creation date and time was noted as 10/02/2023 at 04:33:15 PDT, and the completion date and time was noted as 10/02/2023 at 11:41:56 PDT. As part of this work order, sensor cleaning was performed, and calibration tests were completed to confirm that the issue was resolved. [redacted] As shown in Figure 5, the AV was not in a degraded state immediately prior to the incident on October 2, 2023.

[6] Documentation pertaining to Work Order No. WO-180524

Figure 5. Degraded state status of the AV over a 70 s time window with t=0 corresponding to a time of approximately 21:28:27 PDT.

1.3 Cruise ADS System Description

The Cruise ADS consists of multiple hardware and software subsystems. While the interaction of these subsystems and their contribution to overall ADS performance is a complex topic, we provide a high-level description of primary inputs and software subsystems relevant to our root cause analysis. [redacted] These subsystems are not described in detail below, but they will be discussed as needed for our analysis. A high-level system diagram depicting the main subsystems of the Cruise ADS that are relevant for this analysis is shown in Figure 6.

Figure 6. High-level system diagram of Cruise ADS.[7]

[7] The system diagram is a non-exhaustive representation of the subsystems and interactions of the ADS. [redacted]

1.3.1 Sensing

The AV is equipped with a suite of sensors to enable perception, prediction, and motion planning. These include [redacted] cameras, [redacted] lidars, [redacted] roof mounted radars, [redacted] ultra-short-range radars, and microphones.[8] [redacted] Figure 7 shows some of the externally visible sensors mounted on the roof of the AV.

Figure 7. Roof mounted sensor array which includes lidars, cameras, and radars.

[redacted]

[8] Exponent inspection of Cruise AV enabling hardware.

[9] Cruise LLC's Responses to NHTSA's October 20,2023, Interim Information Request in Preliminary Evaluation 23-018.

[redacted][10]

In addition to lidars, cameras, radars, and microphones, a multitude of other sensors are equipped on the AV, which enable vehicle state estimation and prediction. [redacted]

1.3.2 Perception

[redacted]

As mentioned previously, the AV has an array of different sensors which enable object detection and classification. [redacted]

[redacted]

[10] Cruise LLC's Responses to NHTSA's October 20,2023, Interim Information Request in Preliminary Evaluation 23-018.

[11] [redacted]

[12] [redacted]

[13] [redacted]

[redacted]

Webviz was developed by Cruise as an open-source data visualization tool.[14] Within Webviz, it is possible to visualize the perception data related to these subsystems as well as individual sensors. [redacted] Two examples of visualized camera and lidar data are depicted in Figure 8.

[14] https://getcruise.com/technology/

Figure 8. Example of how object classifications are visualized in Webviz

In addition to object classification, Webviz facilitates observations of object tracking. Figure 9 shows an image captured in Webviz with two tracked objects and the perception subsystems associated with each object at that instance.[15]

15

Figure 9. Example of two tracked objects depicted in Webviz with overlaid information.

Figure 10.

[redacted]

1.3.3 Prediction

The Cruise ADS employs an end-to-end deep learning-based prediction model in order to interpret the motion of tracked objects and contextual scene information in order to generate predicted object trajectories. [redacted] This may be used to plan the AV's trajectory, causing it to yield or adjust its course, among other things.

1.3.4 Planning

The planning system is responsible for orchestrating the AV's actions [redacted]

[redacted] A diagram depicting the architecture of the motion level of the planning system is shown in Figure 11.

Figure 11. High-level system diagram of Cruise ADS Planning system.[16]

[redacted]

[16] The diagram shows an abstract view [redacted] and does not represent a comprehensive view of the planning system functionality.

[redacted]

Figure 12. [redacted]

1.3.5 Cruise ADS Collision Protocol

Collision Detection

The collision detection system facilitates detections of contact with the exterior of the AV. The collision detection system relies on output from [redacted], as well as from other collision detection enabling hardware. The system's enabling hardware includes [redacted] When a dynamic threshold (which considers the various data streams) is exceeded, a potential collision is determined to have occurred, at which point the collision severity is estimated. Collision severity levels are ranked by the Cruise ADS according to injury likelihood, with lower levels corresponding to a greater risk of injury (inversely proportional to the Maximum Abbreviated Injury Scale (MAIS), which ranks injury severity with lower levels corresponding to a lesser degree of injury).

Several variables are considered when assigning a collision severity and prescribing a stopping maneuver response. The collision detection system considers the object type, [redacted]. For the purpose of collision detection, [redacted] only determines whether an object is a motor vehicle/large object or a vulnerable road user (VRU)/small object. With respect to collision severity classification and response, all non-motor vehicle/large objects, including unclassified objects and objects classified as Pedestrians, are all treated as VRUs, which are human road users that are not occupying vehicles.

The impact location is also relevant for estimating the collision severity. [redacted] The collision detection system estimates whether the collision occurred to the front, rear, left side, or right side of the vehicle. This concept is depicted in Figure 13.

Figure 13. [redacted][17][redacted][18]

Finally, the collision speed is considered for collision classification. [redacted] The thresholds for collision classification are shown in Table 3.

[17] Exponent inspection of AV's code pertaining to collision detection.

[18] Cruise AV Point of Impact Concept | Cruise, May 9, 2021

[redacted]

Collision Response

Upon detecting a potential collision, the ADS performs a stopping maneuver based on the collision classification (Table 3), which varies according to the estimated severity of the collision. A taxonomy of stopping maneuvers for the AV is outlined in Table 4. [redacted]

[redacted]

[19] Collision Classification Mapping | Cruise, July 19, 2023

[20] [redacted]

[21] Cruise AV Stopping Maneuver Taxonomy | Cruise, October 13, 2023

Cruise implemented the [redacted] maneuver to enable the AV to reposition itself, if possible, to a Minimal Risk Condition (MRC) away from active traffic after a triggering event. Because the execution of an [redacted] "Outermost Lane Stop" is a key event in the incident sequence, Exponent reviewed Cruise documentation defining the design intent and justification of the criteria for allowable pullover areas. [redacted]

1.3.6 Degraded State

Critical hardware and software systems, which enable ADS functionality, are continuously monitored for system malfunctions to ensure nominal performance. If a system malfunction is detected, the AV may switch to a backup system or perform a maneuver to achieve an MRC. Cruise defines a degraded state (DS) as "the presence of one or more latched failures," which corresponds to "the residual driving capability that the AV has to achieve an MRC."[22] Cruise's DS taxonomy assigns a number or rank according to estimated residual driving performance, with higher degraded state numbers corresponding to less residual driving capability.[23]

[22] Cruise Safety Report. Nov, 2022.

[23] Cruise Safety Report. Nov, 2022.

Table 5. Degraded state taxonomy[24]

Degraded State	Description
DS1	The Cruise AV has a benign latent malfunction indicating the need for service and maintenance attention. The Cruise AV maintains full capability to perform the dynamic driving task ("DDT") and dynamic driving task fallback ("DDT-F"). The malfunction does not lead to a hazard so normal vehicle use until the end of the day (or until the next vehicle power cycle) is expected. The Cruise AV can continue all on-road operations for the remainder of the shift.
DS2	The Cruise AV has a tolerated malfunction in a safety system and maintains the capability to perform the DDT and DDT-F and return to the fleet service facility for repair. The Cruise AV is capable of completing the current mission by falling back to stricter driving constraints or limitations as needed, to help maintain an acceptable level of performance until the Cruise AV returns to the fleet service facility and the issue is resolved. The Cruise AV is recovered by the Field Support team at the fleet service facility for repair. No new fleet operations will be assigned to the Cruise AV in this state.
DS3	The Cruise AV has a system malfunction that results in degraded vehicle performance risking the ability to perform the DDT or DDT-F. The Cruise AV is capable of pulling over to a safe location at the side of the road, followed by engaging Park state and activating hazard flashers. The Cruise AV is retrieved by a Field Support team and returned to a fleet service facility for repair. No new fleet operations will be assigned to the Cruise AV in this state.
DS4	The Cruise AV has partial loss of primary autonomous driving functionality, requiring fallback to the secondary autonomous driving functionality to perform the DDT-F. The Cruise AV is capable of gradually slowing to a stop while steering to a safe location out of high-risk areas such as intersections, followed by engaging its transmission in "Park" and activating its hazard flashers. The Cruise AV is retrieved by a Field Support team and returned to a fleet service facility for repair. No new fleet operations will be assigned to the Cruise AV in this state.
DS5	The Cruise AV has a total loss of primary Autonomous Driving functionality. The Cruise AV can quickly slow down to a stop in its lane of travel, followed by engaging its transmission in "Park" and activating its hazard flashers. The Cruise AV is retrieved by a Field Support team and returned to a fleet service facility for repair. No new fleet operations will be assigned to the Cruise AV in this state.

[24] Cruise Safety Report. Nov, 2022.

2 Investigation Process

Exponent's scope of work was to perform an independent, third-party technical root cause analysis, of the October 2 incident involving a Nissan Sentra (Nissan), pedestrian, and AV. This includes the identification of salient events that occurred throughout the relevant time period leading up to, and following, the AV's collision with the pedestrian, along with an investigation into the causes and contributing factors that substantively impacted the outcome of each event. Because of the complexity of the interactions between the AV, the subject pedestrian, the adjacent Nissan that first collided with the pedestrian, and the environment, it is not possible to assign a single root cause to this incident. Instead, the technique used in this analysis was to identify and understand the root cause and contributing factors, each of which contributed in a potentially substantive way to the outcome of this incident. Due to the timeframe-imposed limitations, Exponent could not evaluate all design and performance aspects of the ADS software as they related to the salient events.

2.1 Data Collection

Exponent relied on documentation provided by Cruise to understand software subsystems, data flow, and AV decision making, as well as interviews with Cruise employees and a multi-day in-person inspection to review detailed, frame-by-frame information of the incident. The documentation Exponent reviewed included system-level software architecture diagrams, Cruise's root cause analysis, documents describing parameters for the AV's response to collisions, the Standing General Order (SGO) report provided by Cruise to NHTSA, video footage of the incident, data recorded by the AV's various sensors and systems, vehicle maintenance records, the traffic collision report, documentation and videos provided to government officials. Exponent also reviewed other relevant records and technical and scientific literature. Prior to, during, and after our on-site inspection, Exponent interviewed and was in frequent communication with Cruise employees to better understand their system architecture and AV decision making process.

Exponent conducted an independent multi-day inspection at Cruise. During the inspection, Exponent used the Webviz data visualization tool to review frame-by-frame perception, prediction, and motion planning data captured on the day of the incident. Webviz supports multiple views for displaying information with configurable layouts to display salient information at different points in time and to support different types of analyses. Exponent utilized multiple layouts and panels to analyze, for example, [redacted]

Additionally, Exponent reviewed data collected by the AV's systems on the predicted position and velocity of both the Nissan and the pedestrian throughout the incident.

2.2 Accident Reconstruction & Video Analysis Methodology

The AV is capable of capturing [redacted] exterior views using onboard cameras, which record continuous video footage of the environment surrounding the AV. These cameras can capture frontal, side, and rearward views [redacted]. Of the [redacted] available views, [redacted] were reviewed by Exponent in a single-window compilation with timing between each view aligned to all others [redacted]. Figure 14 provides an example of each view in the compilation, annotated [redacted] in the upper left corner of the frame. A description of the field-of-view from the nine annotated cameras is provided below:

Figure 14. Graphic exhibiting [redacted] onboard camera views from the AV (annotated with numbers [redacted] in the upper left corner of each view by Exponent).

Embedded time information was displayed in the lower right corner of each frame contained within the video compilation. Exponent independently reviewed the footage and used it in evaluating the following:

- overall event timing
- pre-incident vehicle movement
- interaction between the Nissan and the pedestrian
- post-incident response of the AV
- [redacted]

[redacted] In all analyses performed herein, the speed of the AV was referenced from the vehicle kinematics data (shown in Figure 15).

As part of Exponent's analysis of the subject incident, select camera views depicting key frames were identified throughout the incident sequence for evaluation of position and motion of the AV, Nissan, and pedestrian over time. In addition, the video included information regarding overall traffic conditions. This data, in addition to other data, provided sufficient information for a high-level time-and-position analysis

to be conducted. The video was not utilized to evaluate the overall lighting conditions or visibility at the time of the incident, as cameras can interpret lighting conditions differently than the human eye.[25]

2.3 Human Factors Analysis – Methodology

To better understand how various factors might influence driver behavior it is helpful to break down the steps involved in perceiving a hazard and preparing and executing a response, known as perception-response time (PRT), and to understand that there can be variable reasonable driver responses. PRT is typically broken down into four stages: detection, identification, decision, and response.[26] During the detection stage, the driver must first perceive the hazard (i.e. see or hear "something") and orient their attention to the object.[27] Once the object is detected, the driver must identify whether it represents a hazard and then decide how to respond, if at all.[28] After the decision has been made to respond, the driver must finally initiate and carry out that action.[29] While it is difficult to precisely calculate the temporal duration of each stage, based on decades of research it is possible to estimate PRTs for various accident scenarios.[30] In car-driving under "a fairly straightforward situation and minimal time available for a response," most drivers will respond within 1.5 seconds to a "readily identifiable hazard" that appears directly in front of the driver.[31] However, PRTs can be shorter or longer than this estimate depending on the circumstances.[32] For instance, scientific literature suggests that attentive drivers, on average, respond to expected hazards between 1.1 and 1.6 seconds,[33] while drivers respond to unexpected hazards under nighttime conditions in approximately 2.0 to 3.0 seconds.[34]

Relevant factors that impact PRT include visual attention, conspicuity, and expectancy.[35] In order for a visual signal (e.g., a pedestrian entering the roadway or a vehicle's path of travel) to be an effective indicator of a potential hazard, the driver's attention must be directed to the relevant location or feature in

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25 Krauss, 2015b

26 Krauss, 2015c

27 Krauss 2015b; Barragan et al., 2021

28 Krauss 2015b; Barragan et al., 2021

29 Krauss, 2015c

30 Krauss, 2015c

31 Olson & Farber, 2003

32 Olson & Farber, 2003

33 Olson & Sivak, 1986

34 Triggs & Harris, 1982; Summala, 1981; Muttart, 2003

35 Olson & Farber, 2003, Krauss et al., 2015a; Alexander & Lunenfeld, 1986; Krauss et al., 2015b

the roadway.[36] The ability to discern potential roadway obstacles such as pedestrians, animals, or other vehicles is significantly reduced at night (i.e., in conditions with reduced luminance).[37] Conspicuity, which is defined as "those characteristics of an object or condition that determine the likelihood that it will come to the attention of an observer," can also significantly impact a driver's ability to detect roadway obstacles.[38] Conspicuity depends on many factors, including, but not limited to, contrast, stimulus size, uniqueness, and location within the visual field.[39] For example, glare from oncoming headlights has been shown to impair detection of pedestrian motion.[40] Low conspicuity can increase the time it takes a driver to detect a potential hazard, thus increasing PRT and shortening the time available to avoid a potential accident.[41]

In the context of driving, expectancy relates to a driver's "readiness to respond to situations, events, and information in predictable and successful ways."[42] This "readiness to respond" manifests as quicker responses to potentially hazardous stimuli.[43] For example, drivers can detect an expected hazard from farther away and respond faster than when the hazard is unexpected, such as while driving on a highway or interstate.[44] Violations of driver expectancies can cause considerable delays or failures in detection of an event or obstacle.[45] In addition to unexpected objects or events in the vehicle's path, pedestrians can exhibit unpredictable behavior due to their ability to quickly change trajectories without external indication.[46] According to hazard-perception frameworks, if a perceived hazard is merely a potential hazard, then a change in behavior is likely unnecessary, whereas if the perceived hazard is an actual hazard (i.e., the hazard is "materializing and will interact with the driver if no action is taken"), then action must be taken.[47]

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36 e.g., Falkmer & Gregersen, 2005; Krauss, 2015a

37 Krauss, 2015a; Owens & Sivak, 1993

38 Olson & Farber, 2003; Krauss et al., 2015a

39 Krauss et al., 2015a

40 Incident Video; Wood 2019; Theeuwes et al., 2002

41 e.g., Triggs & Harris, 1982

42 Alexander & Lunenfeld, 1986; Krauss et al., 2015b

43 Alexander & Lunenfeld, 1986; Krauss et al., 2015b

44 Shinar, 1985; Alexander & Lunenfeld, 1986; Krauss et al., 2015b

45 Langham & Moberly, 2003; Rumar, 1990; Olson & Sivak, 1986; Krauss, 2015c

46 AVSC Best Practice for Interactions Between ADS-DVs and Vulnerable Road Users (VRUs), 2022

47 Barragan et al. 2021

3 Root Cause Analysis

3.1 Incident Sequence Assessment

The sequence of salient events prior to, during, and following the collision between the AV and the pedestrian will be described in the following sections. The timing of each event is normalized to the point at which the AV first contacts the pedestrian (t=0), [redacted]. This will herein be referred to as the 'AV-pedestrian collision'. As a convention, time information is given in relative time to the nearest 0.1s. However, a greater number of salient events are identified immediately prior to and after the AV-pedestrian collision. Therefore, Exponent has provided time data to the nearest 0.01s for events that occur within 2 seconds of the AV-pedestrian collision, so as to provide a higher level of granularity. Events that occurred prior to the initial collision of the pedestrian with the AV will be referenced by negative time, and events that occurred following 'AV-pedestrian collision' will be referenced by positive time. The timeline of salient events is outlined in Table 6. A subset of these salient events is shown alongside the AV velocity, acceleration, and steering wheel angle in Figure 15.

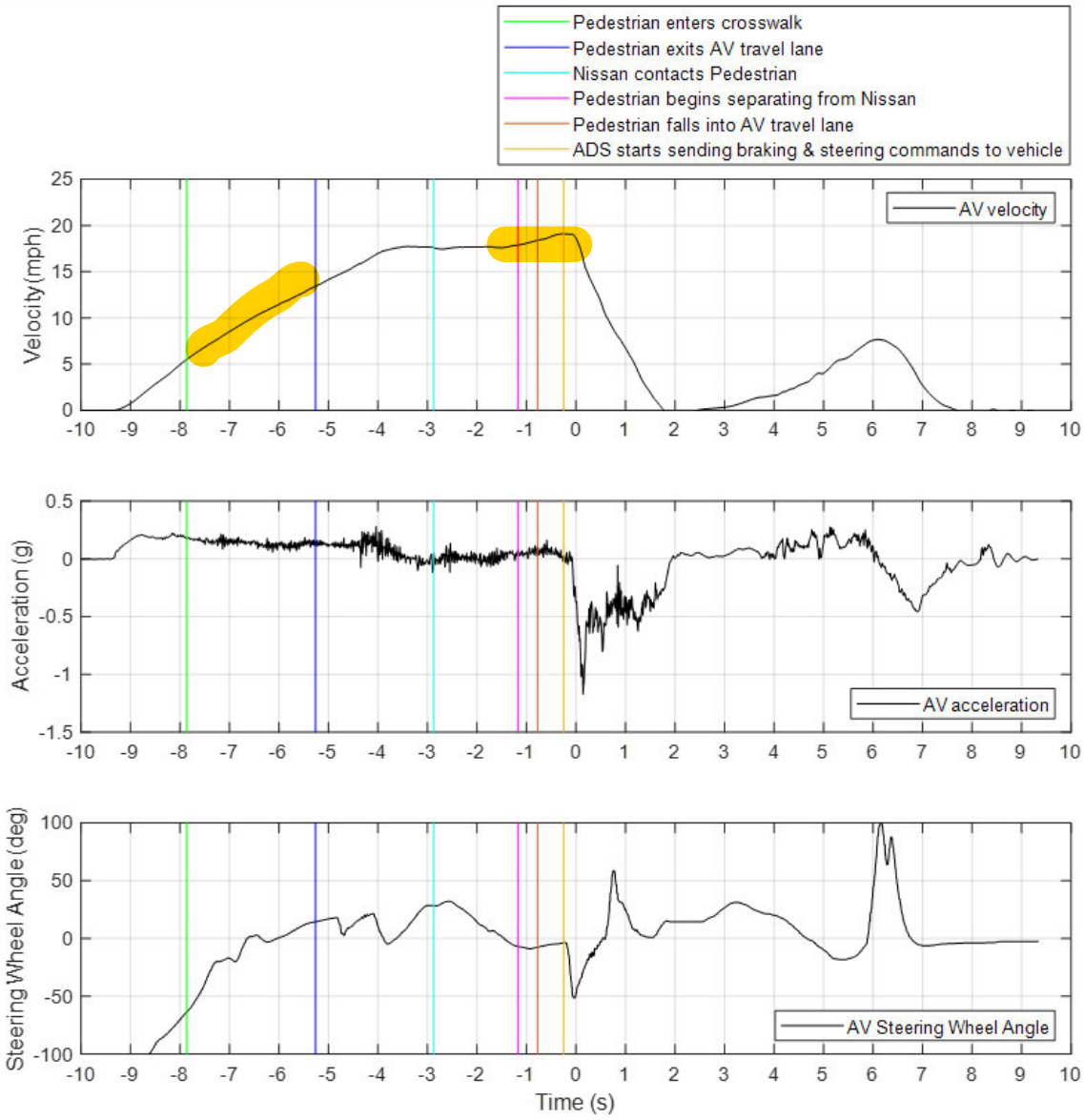


Figure 15. Timeline of certain events overlaid on AV velocity (top), acceleration (middle), and steering wheel angle (bottom). Time is normalized such that contact between the pedestrian and AV occurs at t = 0 s.

Table 6. Timeline of salient events

Event	Unix Time (s)	Relative Time (s)
Pedestrian first classified as pedestrian and 'tracked' with ID 138048784 at approximately 21:28:34 PDT	1696307313.4	-38.3
AV becomes static due to red traffic light	1696307324.8	-26.9
Traffic light changes to green	1696307341.7	-10.0
Nissan begins moving after light change	1696307342.4	-9.3
AV begins moving after light change	1696307342.4	-9.2
Pedestrian appears (visually) to enter 5th Street crosswalk	1696307343.8	-7.9
Prediction output shows pedestrian path crossing AV travel lane[48]	1696307344.0	-7.7
Pedestrian leaves AV's travel lane	1696307346.4	-5.3
Pedestrian stops/pauses in crosswalk	1696307347.0	-4.7
Contact between pedestrian and Nissan occurs	1696307348.8	-2.9
Pedestrian track (ID 138048784) is dropped	1696307349.7	-2.0
Pedestrian begins separating from Nissan (visually)	1696307350.49	-1.17
[redacted]	1696307350.85	-0.81
Pedestrian lands in AV's travel lane	1696307350.89	-0.78
An imminent collision is predicted by the 'collision checker'[49]	1696307351.25	-0.41
AV begins sending commands for steering & braking[50]	1696307351.41	-0.25
Initial contact between pedestrian and AV occurs	1696307351.66	0.00
Collison checker node outputs that a collision has occurred	1696307351.87	0.21
ABS status change	1696307351.89	0.23
AV velocity initially becomes zero post impact[51]	1696307353.44	1.78
AV begins sending commands to begin accelerating post impact	1696307353.49	1.83
TCS status change	1696307355.5	3.8
DS4 triggered	1696307357.5	5.8
AV reaches its final point of rest	1696307360.4	8.8

[48] At all times, the highest confidence predicted path associated with pedestrian track ID 138048784 does not conflict with the planned path for the AV. The system correctly estimates that the pedestrian will fully traverse the AV's travel lane prior to the AV occupying this region.

[49] [redacted]

[50] [redacted]

[51] It was determined through review of the video footage as well as vehicle kinematics and [redacted] that the vehicle did not become static after the AV collided with the pedestrian and prior to accelerating again. However, the vehicle's longitudinal velocity did reach zero, and subsequently became negative as the sprung mass of the vehicle translated rearward. As the sprung mass translated in the forward direction, the vehicle began to accelerate. Therefore, the point at which the AV velocity initially became zero was determined to be the moment when the longitudinal velocity of the vehicle's sprung mass reached zero.

3.2 Nissan-Pedestrian Collision

This section describes the sequence of events that led to the initial collision of the pedestrian with the Nissan. A timeline of salient events prior to the Nissan-Pedestrian collision is depicted in Figure 16.

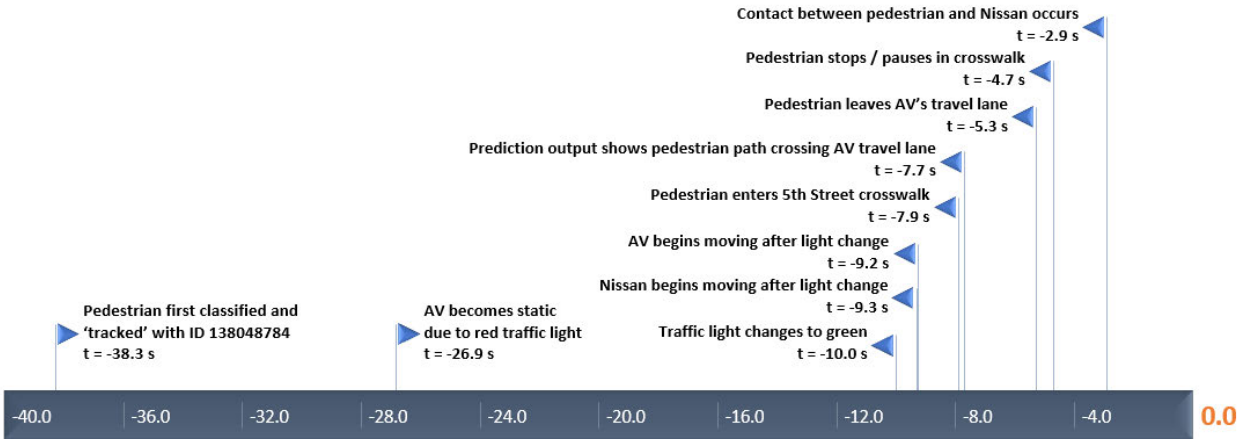


Figure 16. Timeline of salient events prior to Nissan-Pedestrian collision.

3.2.1 Accident Reconstruction Video Analysis –Nissan-Pedestrian Collision

Review of the video indicated the Nissan and AV were traveling in the southbound direction on Cyril Magnin Street before stopping for a red traffic signal at the intersection with Market Street. The Nissan was positioned in the inner through lane to the left of the AV over the stop bar. As presented in Figure 17, Camera 4 captured a left side view from the AV and depicted the location of the Nissan, while Camera 5 depicted a wide-angle view to the front of the AV providing information regarding the relative position of the Nissan with respect to the AV. Pre-existing damage to the passenger side of the Nissan included a fractured front hubcap and deformed fender, and the side-view mirror housing was separated from its attachment and dislodged, as observed in the Camera 4 image.

Figure 17. Select frames from AV [redacted] depicting vehicle positions as signal for southbound traffic towards 5th Street turned green.

An additional data/video compilation was provided by Cruise, combining [redacted] camera views with a [redacted]. From this data, the relative positions of the Nissan and AV could be further defined, and other objects tracked by the AV could be observed during the incident sequence (Figure 18). [redacted]

Figure 18. Example frame from data/video compilation, combining camera views with [redacted] for the AV as the vehicles began to accelerate from a stop.

Approximately 0.7 seconds after the traffic signal changed to green, the Nissan and AV began to accelerate and move to the south. As the AV started to accelerate, it moved rightward in its travel lane to align with a shift in its travel lane. Moments later, the pedestrian on the southwest corner proceeded to the east, entering 5th Street within the crosswalk perpendicular to the travel direction of the approaching vehicles. Over approximately 2.6 seconds, the pedestrian entered the 5th Street crosswalk, fully traversed the AV's

travel lane, and entered the Nissan's travel lane. Approximately 0.6 seconds later, prior to reaching traffic traveling in the northbound direction, the pedestrian paused in the Nissan's lane of travel. As captured by the video, the Nissan and AV proceeded forward having a green traffic signal. However, a *Do Not Walk* signal was illuminated for the crossing pedestrian. The AV reached a travel speed of approximately 15.0 mph by the time the pedestrian paused within the crosswalk in front of the approaching Nissan. As the adjacent Nissan remained in a similar longitudinal position relative to the AV through the midpoint of the intersection, the two vehicles were traveling at comparable speeds during this segment.

Figure 19. Frames from AV [redacted] depicting the relative positions of the Nissan and AV as the pedestrian paused within the 5th Street crosswalk of the inside traffic lane.

Based on Exponent's evaluation of the provided video, the pedestrian was struck by the Nissan approximately 2.4 seconds after leaving the AV's travel lane. During this time, the pedestrian did not appear to look to the left and instead can be seen waving or signaling, possibly towards northbound traffic. The AV's onboard video documented the positions of the Nissan, AV, and pedestrian at the time the Nissan and pedestrian made contact (Figure 20). At the time of impact between the Nissan and pedestrian, the AV was traveling at a speed of approximately 17.6 mph. The frame from Camera 4 shows the Nissan had advanced forward with respect to the AV, indicating that it accelerated and was traveling faster than the AV during this segment.

Figure 20. Key frames from AV onboard [redacted] depicting relative positions at the approximate time of the Nissan-pedestrian contact.

Figure 21 depicts a frame from the data/video compilation, including [redacted] In this figure, the time at which the Nissan first made contact with the pedestrian is depicted. [redacted]

Figure 21. Frame from data/video compilation providing [redacted] at the approximate time of the Nissan-pedestrian contact.

3.2.2 AV Interpretation of Nissan-Pedestrian Collision

The pedestrian was first detected by one of the AV's onboard lidars, was correctly classified as a pedestrian, and was tracked with ID 138048784 approximately 38.3 seconds prior to the initial collision with the AV. At this time, the AV was traveling southbound on Cyril Magnin Street approaching the intersection with Market Street and was slowing in response to a red traffic signal. The pedestrian was traversing the sidewalk on the west side of Cyril Magnin Street and was approaching the adjacent crosswalk that crosses Market Street. The Nissan adjacent to the AV was classified as a "Car" and was tracked by the AV. The AV came to a stop approximately 26.9 seconds prior to the initial collision with the pedestrian, at which time the pedestrian was still in the adjacent crosswalk, traversing Market Street against a "*Do Not Walk*" pedestrian signal.

Figure 22. Webviz visualization of the scene as the AV came to a stop at the intersection. The pedestrian was detected and tracked (with track ID 138048784) as the pedestrian crossed from the north side of Market Street (left) towards the south side of market street (right). [redacted] North direction towards bottom right corner in the illustrations.

As mentioned in Section 1.3, [redacted] The pedestrian was consistently detected, classified as a pedestrian, and tracked by the AV as the pedestrian traversed the adjacent crosswalk (across Market St.), waited at the south corner of the intersection, and traversed the travel lane of the AV in the opposite crosswalk (across 5th St.) until shortly after the pedestrian was struck by the Nissan. [redacted]

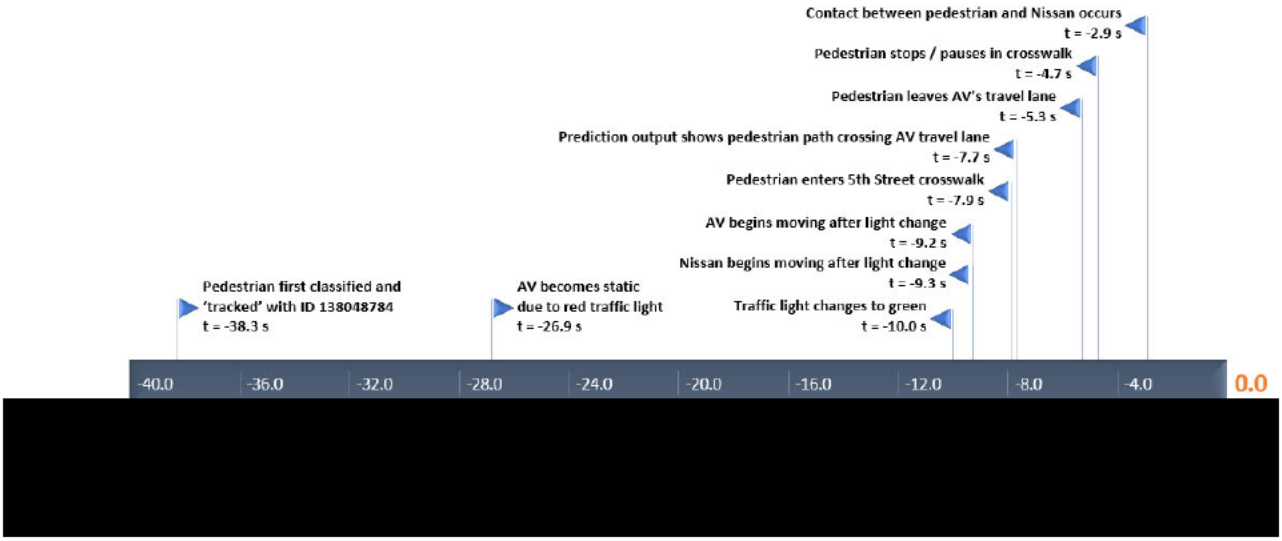


Figure 23. Timeline depicting [redacted] which contributed to the tracking of the pedestrian while it had an associated track ID of 138048784. [redacted] are represented in the legend as denoted in Webviz (refer to Section 1.3.2).

As the pedestrian entered the 5th street crosswalk, the ADS prediction system generated path predictions for both the pedestrian and the Nissan, which were traveling approximately perpendicular to each other. As the Nissan approached the pedestrian, the highest probability paths predicted for the pedestrian and Nissan became consistent with a potential collision (Figure 24).

Figure 24. Prediction of intersecting paths for the Nissan (track ID 136423344) and the pedestrian (track ID 138048784) ~4.8 s prior to AV-pedestrian contact.

Prior to the collision between the Nissan and the pedestrian, for the AV to bias rightward in response to a lateral constraint in the AV's path approximately 4.6 seconds before the AV-pedestrian collision. The exact cause of the rightward bias is not clear from the reviewed data, but it could be due to the presence of the pedestrian as it is the closest obstacle in the proximity of the planned rightward bias. with less rightward bias, Approximately 0.3 seconds later, reduces the amount of rightward bias (right image of Figure 25). It is not clear from the reviewed data if this response is because a lateral constraint due to the pedestrian was no longer present.

Figure 25. Image depicting the moment when [redacted] rightward bias approximately 4.6 seconds prior to the AV-pedestrian collision (left). Image depicting the moment when rightward bias is reduced approximately 4.3 seconds prior to the AV-pedestrian collision (right).

The Nissan was traveling at an estimated velocity of approximately 21.7 mph, according to the AV, when it collided with the pedestrian in the lane adjacent to the AV, approximately 2.9 seconds prior to the AV-pedestrian collision. At the time of collision between the Nissan and the pedestrian, the pedestrian was classified as a pedestrian ([redacted]) and had an associated track (with track ID 138048784). The pedestrian had a predicted velocity (by the ADS) of approximately 2.6 mph (Figure 26) when the Nissan-pedestrian collision occurred. Camera images captured at the approximate time of Nissan-pedestrian contact are shown in Figure 27.

Figure 26. [redacted] depicting the moment of impact between the Nissan and pedestrian, approximately 2.9 s prior to AV-pedestrian collision. Nissan and AV travel directions are to the right.

Figure 27. AV onboard camera frame [redacted] showing the approximate moment of Nissan-pedestrian contact, ~2.9 s prior to AV-pedestrian collision. [redacted] the pedestrian as a "Human".

At the time of Nissan-pedestrian collision, the AV had a velocity of approximately 17.6 mph, and [redacted] the AV trajectory by either the pedestrian or the adjacent Nissan. [redacted] It is apparent that the AV considered the predicted paths of the Nissan and Pedestrian and whether those paths were likely to conflict with the AV's planned trajectory. However, in planning the AV's trajectory, the ADS did not consider the potential of a collision between the Nissan and the pedestrian.

3.2.3 Human Factors Analysis –Nissan-Pedestrian Collision

The relevant time period prior to the Nissan's contact with the pedestrian starts when the pedestrian first steps into the crosswalk against the signal phase (approximately 7.9 seconds prior to the AV's contact with

the pedestrian) and lasts for approximately 5.0 seconds until the Nissan contacts the pedestrian (approximately 2.9 seconds prior to the AV's contact with the pedestrian). While most reasonable human drivers would detect a pedestrian across the intersection stepping into their lane of travel under most conditions, the detection of a pedestrian in such circumstances can be diminished by aspects of the surrounding environment and lighting conditions. For example, as the behavior of the Nissan driver in this incident demonstrates, the presence of a pedestrian in the vehicle's path does not always result in drivers responding appropriately, or at all, prior to a collision. It is possible that a reasonable human driver, especially one accustomed to driving in an urban area where pedestrians enter the roadway while traffic is in motion, would proceed with caution at this stage, yet still proceed with the pedestrian continuing to move across that driver's lane of travel. Some reasonable drivers would determine that the pedestrian in the adjacent lane did not represent a hazard and therefore no reaction was necessary, while other reasonable drivers might determine that, given that pedestrian behavior can be unpredictable, a pedestrian at any position in the roadway could constitute a potential hazard and would warrant a response (e.g., slow or otherwise apply the brakes).

3.3 Cruise AV-Pedestrian Collision

This section describes the sequence of events that occurred after the Nissan-pedestrian collision and leading up to the time of the AV-pedestrian collision. A timeline of salient events prior to the AV-pedestrian collision is depicted in Figure 28. As mentioned previously, there are numerous salient events which occur in this period. provide a higher level of granularity, time data to the nearest 0.01s is provided for events that occur within 2 seconds of the AV-pedestrian collision.

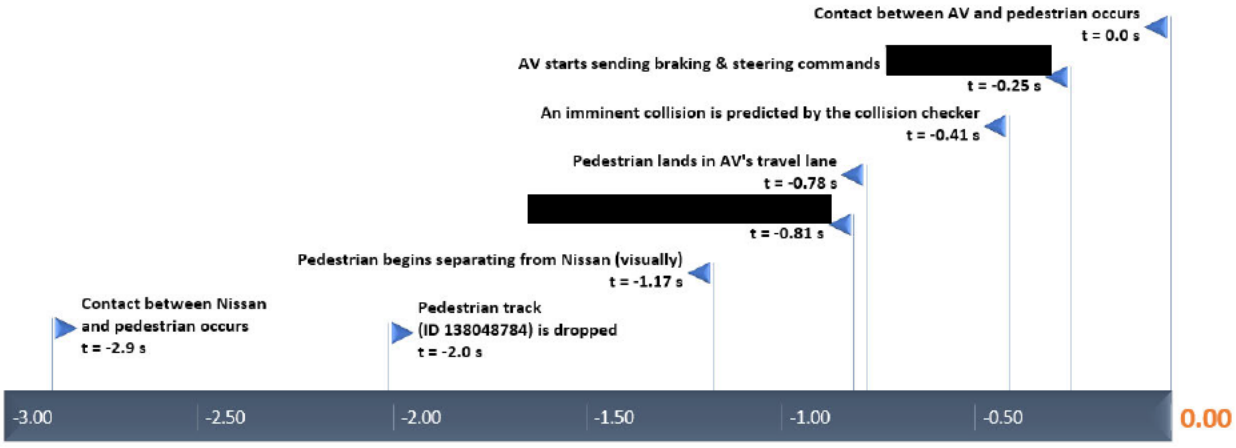


Figure 28. Timeline of salient events between pedestrian's collision with Nissan and subsequent collision with the AV.

3.3.1 Accident Reconstruction Video Analysis – AV-Pedestrian Collision

Exponent visually identified the time at first contact and time at separation between the pedestrian and the Nissan as approximately 2.9 seconds and 1.17 seconds prior to the AV-pedestrian collision, respectively. Shortly after separation, the pedestrian was thrown at an unknown velocity and landed in the AV lane of travel approximately 0.78 seconds prior to the AV-pedestrian collision. This sequence of events is described in more detail below.

Immediately following the contact with the pedestrian, the operator of the Nissan input a leftward steer and correspondingly, the vehicle moved to the left crossing the centerline and entering the northbound traffic lane. This movement created additional lateral separation between the Nissan and AV. Approximately 1.0 second after the Nissan moved left, the vehicle can be observed moving back towards the right, likely as a result of rightward steering by the operator[52] (Figure 29). As the Nissan moved forward and to the right, the pedestrian was carried by the vehicle in the same direction. During this time, the AV continued traveling to the south, slightly behind the Nissan. The AV reached a speed of approximately 17.6 mph at the time of collision between the Nissan and the pedestrian, and it maintained approximately this speed throughout this 1-second window.

Figure 29. Frame from AV [redacted] depicting the approximate location where the Nissan began to move towards the right.

[52] The rapid left and right movement of the Nissan is substantial and is, therefore, most likely the result of operator steering inputs.

The pedestrian separated from the Nissan approximately 1.17 seconds before the AV-pedestrian collision occurred.[53] Approximately 0.1 s after pedestrian separation from the Nissan (1.07 seconds prior to the AV-pedestrian collision), the Nissan's brake lights illuminated, indicating a brake application by the driver. Corresponding to the time of Nissan brake light illumination, the AV was traveling at a speed in the range of 18.0 mph and remained positioned approximately one car length behind the Nissan in the outside traffic lane. As the pedestrian separated from the Nissan, the video shows the continued rightward movement of the Nissan as the pedestrian was redirected into the outermost traffic lane occupied by the approaching AV. Images from the onboard video corresponding to the activation of the Nissan's brake lights are provided in Figure 30.

Figure 30. Frames from [redacted] depicting vehicle locations as the Nissan's brake lights illuminated (annotated with yellow arrow by Exponent).

Within approximately 1.5 s following the Nissan's brake application, the Nissan came to rest. The cameras documented the Nissan continuing its rightward movement as it slowed and came to rest at a small, clockwise angle relative to its lane of travel with the right front tire positioned near the white lane stripe (Figure 31). The pedestrian occupied the left region of the outside traffic lane.

[53] The timing of this event is determined visually based on camera data [redacted]

Figure 31. Frame from [redacted] depicting rest position of Nissan and location of AV when it initially came to a stop prior to advancing further south.

As the Nissan traveled rightward towards the AV lane of travel and the pedestrian separated from the Nissan, landing in the outside travel lane, the AV reached a speed of approximately 19.1 mph before braking was initiated by the AV approximately 0.25 s prior to AV-pedestrian contact. The initiated braking was coincident with initiated steering by the AV, which caused a slight rightward heading change in the vehicle. The application of the AV brakes resulted in slowing the AV to approximately 18.6 mph as contact with the pedestrian occurred. This contact between the AV and pedestrian occurred approximately 0.2 s after the Nissan came to a halt. Frames depicting the approximate position of the pedestrian prior to interacting with the AV are depicted in Figure 32 and Figure 33.

Figure 32. Views from [redacted] depicting position of the pedestrian in the right lane in front of the approaching AV.

Figure 33. View from [redacted] at its closest timestamp to the first interaction between the pedestrian and the AV, within 0.1 s post collision.

[redacted]

[redacted]

[redacted]

[redacted]

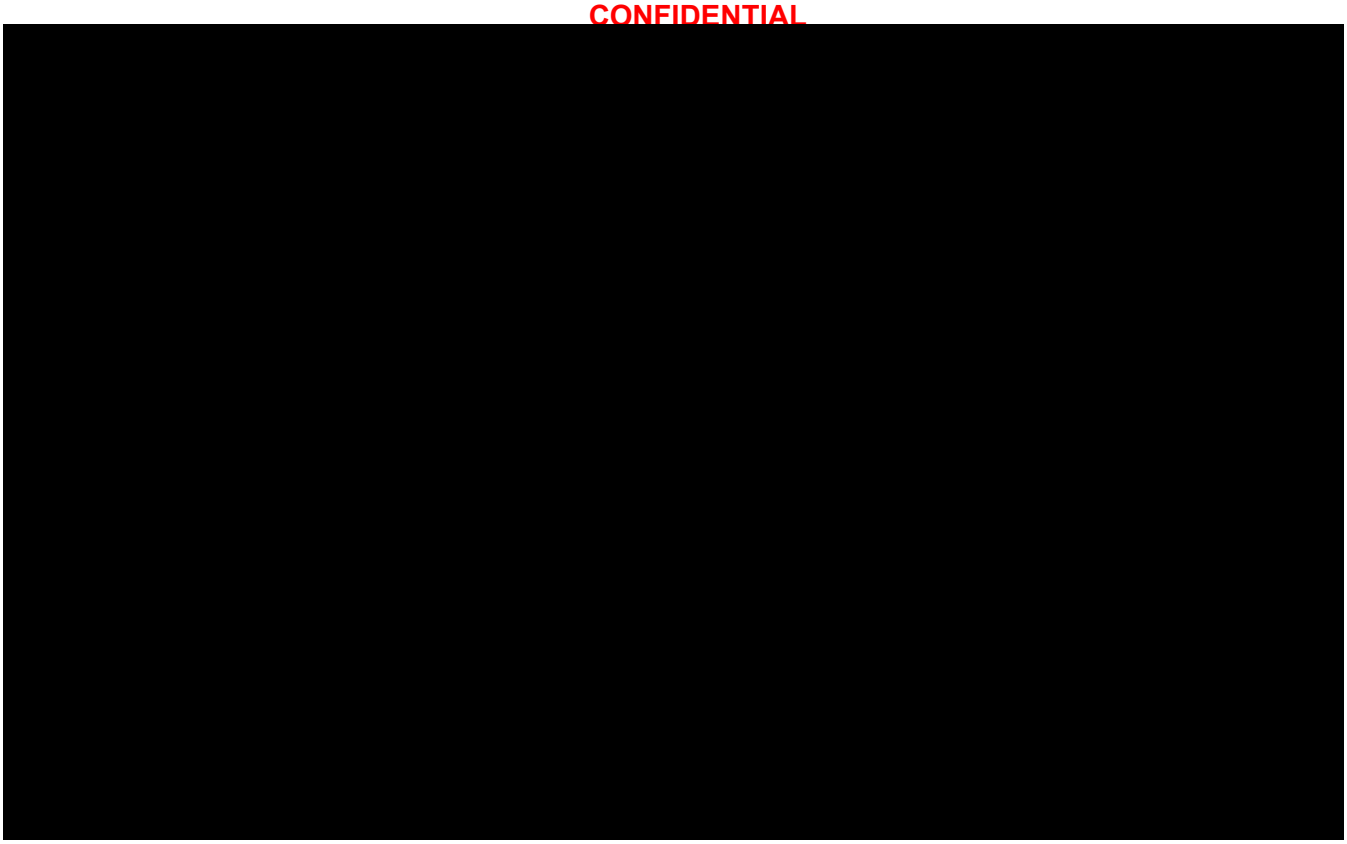
[redacted]

[redacted]

54 [redacted]

[redacted]

[redacted]



[redacted]

3.3.3 Calculated stopping distance of the Cruise AV

The point at which the AV-pedestrian collision was unavoidable via braking (excluding any steering avoidance maneuver) was calculated based on performance limits of the AV planner system while also accounting for brake system latency[55]. The dynamic performance limits of the AV are shown in Table 9.

[redacted]

Using the parameters defined in Table 9, hypothetical brake activations are considered with varied initial velocity. The braking performance is idealized, assuming the maximum thresholds defined in Table 9 and discounting the impact of road gradient, road coefficient of friction, and lateral motion of the vehicle. Idealized braking for several different initial velocities is depicted in Figure 40.


[redacted]

Figure 40. Calculated stopping distance and time assuming idealized braking with varied initial velocity.

55 [redacted]

56 Provided by Cruise.

The point at which AV-pedestrian contact was unavoidable via braking was then determined by comparing minimum stopping distance for a range of initial velocities to a calculated relative displacement from the point at which the AV-pedestrian contact occurred (as determined by [redacted]). The brake system latency was considered to determine the last point at which contact between the AV and the pedestrian could have been avoided by the initiation of braking commands. Accounting for brake system latency, the system would have needed to initiate a brake request no later than 0.78 seconds prior to AV-pedestrian contact in order to completely avoid contact. At this relative time, the pedestrian had just fallen into the AV's travel lane, the AV was traveling at approximately 18.4 mph and the AV was approximately 6.55 m (21.5 ft) from the point at which AV-pedestrian contact occurred. It is noteworthy that a hypothetical brake activation occurring after this time (and prior to when the AV initiated braking at 0.25 s) would have potentially mitigated the severity of the initial collision between the AV and the pedestrian. The extent of this potential mitigation was not determined in this analysis.

3.3.4 Human Factors Analysis – AV-Pedestrian Collision

Nissan Contact with the Pedestrian

The Nissan made contact with the pedestrian approximately 2.9 s before the AV-pedestrian collision. Some reasonable drivers would perceive the impact between the Nissan and the pedestrian happening in the adjacent lane and recognize the impact as a situation that they would need to respond to,[57] while others may not predict or detect the impact due to factors such as violations of expectancy, glare, or A-pillar occlusion.[58] Some drivers (that would notice the impact) would respond by braking or other evasive maneuvers,[59] while others would not react. The AV's speed at the time of the Nissan-pedestrian collision was approximately 17.6 mph. Considering a typical PRT range of 2.0 to 3.0 s for an unexpected hazard at night,[60] and a braking time range of 1.1 to 1.2 s,[61] a reasonable human driver would likely not have been able to avoid the collision under similar circumstances.

[57] Crundall et al., 2012; Barragan et al., 2021

[58] Krauss, 2015c; Wood, 2019; Theeuwes et al., 2002; Reed, 2008

[59] Crundall et al., 2012; Barragan et al., 2021

[60] Triggs & Harris, 1982; Summala, 1981; Muttart, 2003

[61] Figure 40, Based on a vehicle speed range of 16.8 to 19.0 mph at the moment of brake initiation.

Pedestrian Separates from the Nissan

The pedestrian can be seen separating from the Nissan vehicle in the inside lane approximately 1.17 s before interacting with the AV. Some reasonable human drivers would perceive this event as a potential hazard in the adjacent lane and react, while others would predict no reaction was needed. The AV's speed at this time was approximately 17.9 mph. Considering a typical PRT range of 2.0 to 3.0 s for an unexpected hazard at night, and a braking time range of 1.1 to 1.2 s, a reasonable human driver would likely not have been able to avoid the collision under similar circumstances.

Pedestrian Crosses into AV's Lane

The pedestrian landed in the AV's travel lane approximately 0.78 s before interacting with the AV. Most reasonable human drivers would react to a pedestrian landing in the lane with a braking response or avoidance maneuver.[62] The AV's speed at this time as approximately 18.4 mph. Considering a PRT range of 1.1 to 1.6 s typical of expected hazards,[63] and the braking time range of 1.1 to 1.2 s, a reasonable human driver would likely not have been able to avoid the collision under similar circumstances.

3.4 Cruise AV Post-Collision Response

This section describes the sequence of events that occur after the AV makes initial contact with the pedestrian, including drive over, and subsequent actions by the AV. A timeline of salient events after the AV-Pedestrian collision is depicted in Figure 41. As mentioned previously, there are numerous salient events which occur in this period. So as to provide a higher level of granularity, time data to the nearest 0.01 s is provided for events that occur within 2 s of the AV-pedestrian collision. A subset of these salient events is shown alongside the AV velocity, acceleration, and steering wheel angle in Figure 42.

[62] e.g., Crundall et al., 2012

[63] Olson & Sivak, 1986

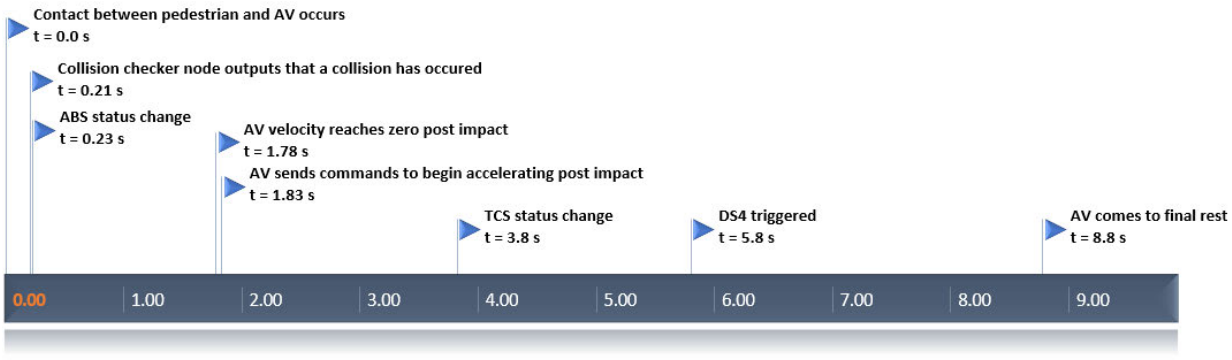


Figure 41. Timeline and event sequence of post collision.

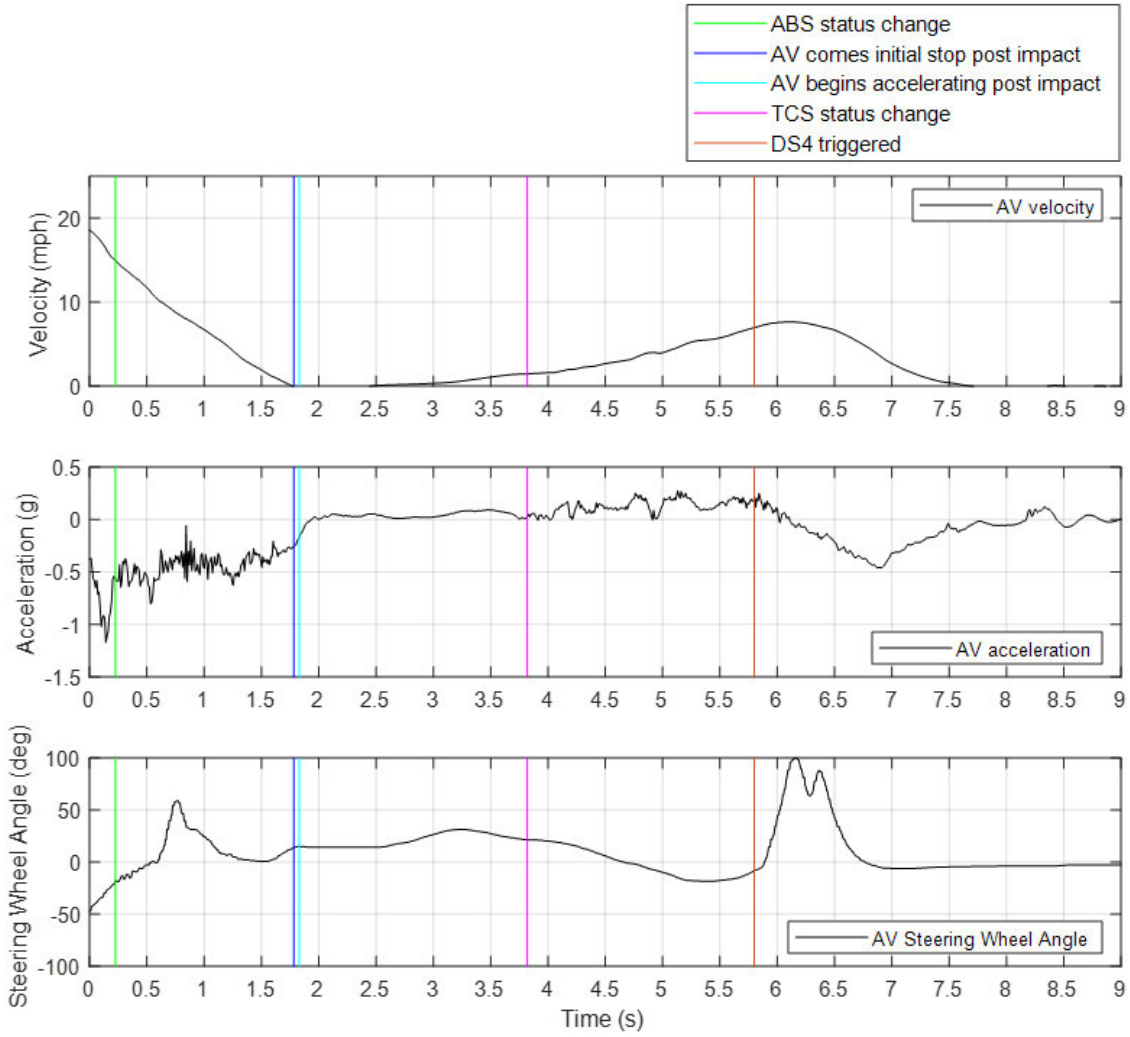


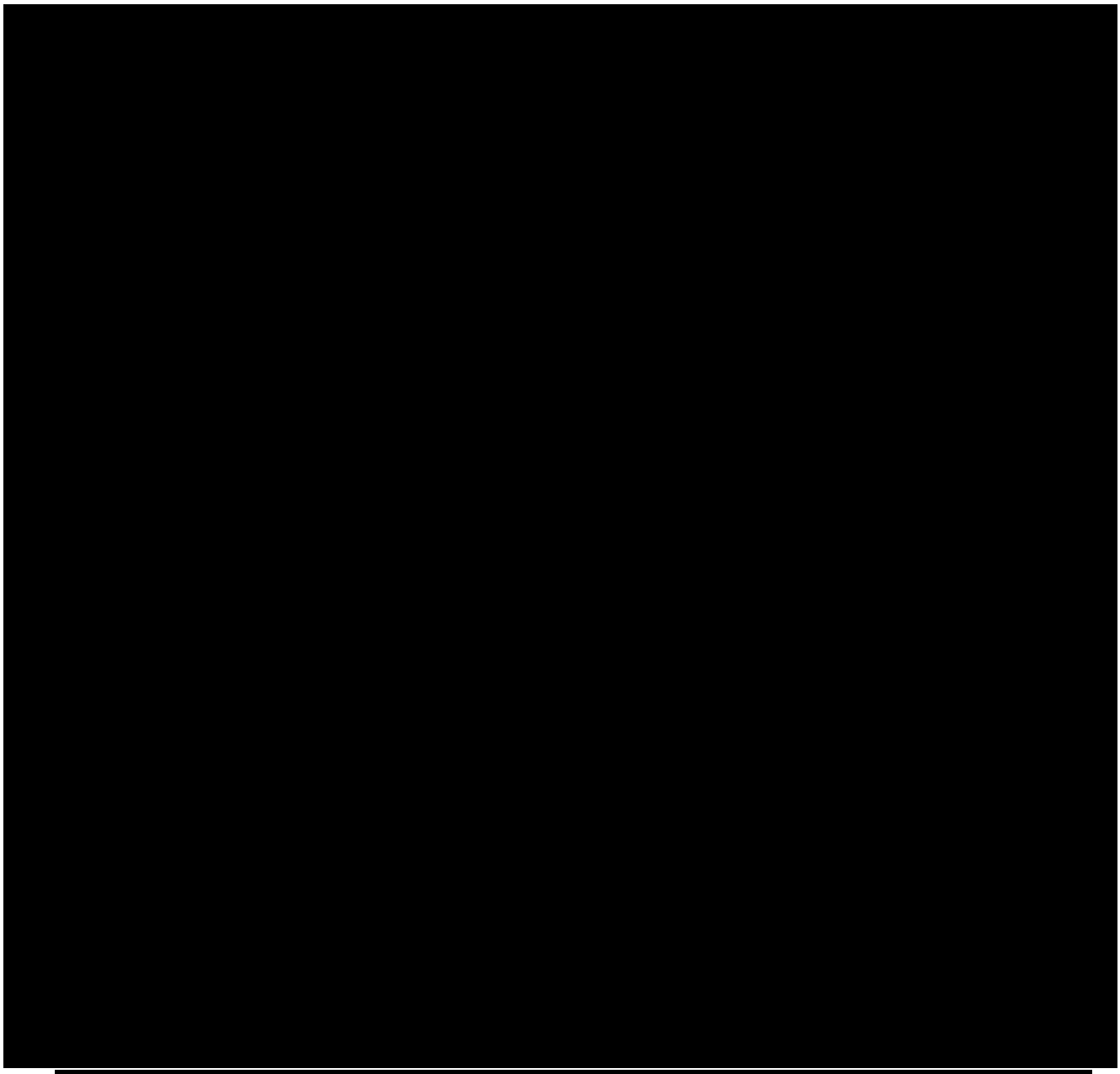
Figure 42. Timeline of post AV-pedestrian collision salient events overlaid on AV velocity, acceleration, and steering wheel angle. Time is normalized such that contact between the pedestrian and AV occurs at t = 0 s.

3.4.1 Accident Reconstruction Video Analysis – Post-Collision Response

After contacting the pedestrian, the AV continued forward movement while decelerating for approximately 1.78 seconds, coming to an initial stop with its front bumper positioned ahead of the Nissan. The average and peak deceleration of the AV (recorded by onboard accelerometers) was 0.44 g and 1.17 g, respectively. At initial rest, the AV was located between the adjacent Nissan on its left and a dedicated bike lane on its right, separated from traffic by flexible vertical markers (Figure 43). From this position, the AV then moved to the south approximately 20 feet reaching a maximum speed of approximately 7.7 mph before reaching its final rest position.

Figure 43. Frames from [redacted] depicting rest position of the Nissan and location of the AV when the Nissan initially came to a stop prior to advancing further south.

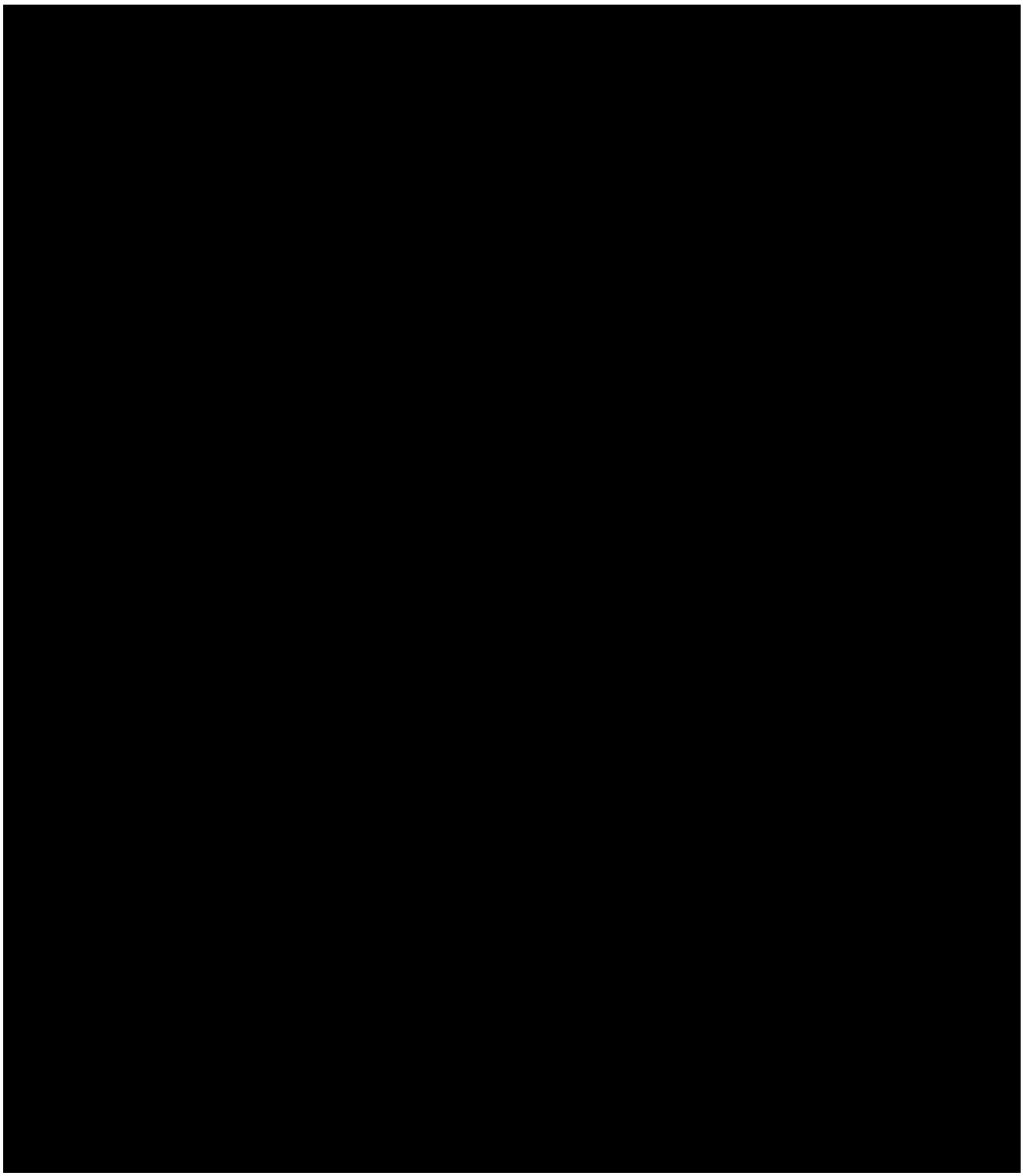
[redacted]



[redacted]

[redacted]

[redacted]



[redacted]

[redacted]

[redacted]

3.4.3 Human Factors Analysis – Post-Collision Response

After the AV contacted the pedestrian, an alert and attentive driver would be aware that an impact of some sort had occurred and would not have continued driving without further investigating the situation.

4 Findings and Conclusions

Leading up to the collision between the Nissan and the pedestrian, the AV accurately detected, classified, and tracked both the pedestrian and the Nissan. As the Nissan approached the in-path pedestrian, who was first crossing and then paused in lane, the AV's predicted paths for the pedestrian and Nissan became consistent with a potential collision as shown in Figure 54.

Figure 54. Prediction of intersecting paths for the Nissan (track ID 136423344) and the pedestrian (track ID 138048784) ~4.8 s prior to AV-pedestrian contact.

The Nissan was traveling at a speed of approximately 21.7 mph when it struck the pedestrian without braking. At the same time as the collision between the Nissan and the pedestrian, the AV was traveling at a speed of approximately 17.6 mph and was not predicting that either the Nissan or the pedestrian would enter the AV's travel path. The collision between the Nissan and pedestrian occurred approximately 2.9 s before the collision between the AV and the pedestrian as shown in Figure 55 and Figure 56.

Figure 55. [redacted] depicting the moment of impact between the Nissan and pedestrian, approximately 2.9 s prior to AV-pedestrian collision. Nissan and AV travel directions are to the right.

Figure 56. AV onboard camera frame from [redacted] showing the approximate moment of Nissan-pedestrian contact, ~2.9 s prior to AV-pedestrian collision. [redacted] of the pedestrian as a "Human".

Following the collision between the Nissan and the pedestrian, the pedestrian remained engaged with the Nissan for approximately 1.7 s, first at the vehicle hood and then tumbling to the roof. During this time, the Nissan moved left, crossing the centerline into the lane of oncoming traffic. Approximately 1.0 s after contact between the Nissan and the pedestrian, the Nissan moved right toward the AV travel lane. The pedestrian then separated from the Nissan approximately 1.17 s prior to the collision between the AV and the pedestrian. At this separation time, the AV was traveling at a speed of approximately 17.9 mph and was approximately one car length behind the Nissan in the adjacent right lane. The brake lights on the Nissan illuminated approximately 0.1 s after the Nissan struck the pedestrian. The AV was traveling at approximately 18.4 mph when the tumbling pedestrian was thrown at an unknown velocity and landed face down in the left region of the traffic lane occupied by the approaching AV, approximately 0.78 s prior

to being struck by the AV. The Nissan came to rest at a small, clockwise angle relative to its lane of travel with the right front tire positioned near the white lane stripe.

As evidenced by the video and sensor data, the classification and tracking of the pedestrian became intermittent within 1.0 s after the initial contact between the pedestrian and the Nissan until the last correct object classification occurred at approximately 0.3 s prior to the collision between the AV and the pedestrian. This intermittent classification and tracking of the pedestrian led to an unknown object being detected (Figure 57) but not accurately tracked by the Automated Driving Dystem (ADS) of the AV and the AV detected occupied space in front of the AV.

Figure 57. [redacted] showing the moment the pedestrian was tracked and classified as a "Dynamic_unknown" object with an ID of 139585040. [redacted]

The ADS started sending steering and braking commands to the vehicle at approximately 0.25 s prior to the collision between the AV and the pedestrian (Figure 58) due to the detection of occupied space in front of the AV. Consequently, just prior to the collision with the pedestrian, the AV's heading momentarily changed rightward, and the vehicle began decelerating.

Figure 58. [redacted]

This deceleration resulted in a vehicle speed reduction from approximately 19.1 mph, prior to the onset of braking, to approximately 18.6 mph at the time of impact with the pedestrian. After the AV's front bumper first contacted the pedestrian, the ADS collision detection system detected a collision (Figure 59).

Figure 59. View from the [redacted] at its closest timestamp to the first interaction between the pedestrian and the AV, within 0.1 seconds post collision.

In order to determine the location of impact, the collision detection system refers to available object tracking information immediately prior to the detected impact. In the time immediately prior to impact, the pedestrian was substantially occluded from view of the lidar sensors, which facilitate object detection

and tracking for the collision detection system. Only the pedestrian's raised leg, which was bent up and out toward the adjacent lane, was in view of these lidar sensors immediately prior to collision. Due to a lack of consistent detections in this time frame, the tracking information considered by the collision detection system did not reflect the actual position of the pedestrian as shown in Figure 60. Consequently, the collision detection system incorrectly identified the pedestrian as being located on the side of the AV at the time of impact instead of in front of the AV and thus determined the collision to be a side impact.

Figure 60.

After contacting the pedestrian, the AV continued decelerating for approximately 1.78 s before coming to its initial stop with its bumper position located forward of the Nissan. The AV's left front wheel ran over the pedestrian and triggered an anti-lock braking system event approximately 0.23 s after the initial contact between the pedestrian and the AV's front bumper (Figure 61).

Figure 61. Variance of the readings

The determination by the ADS that a side collision occurred, and not a frontal collision, led to a less severe collision response being executed and resulted in the AV performing the subsequent outermost lane stop maneuver instead of an emergency stop. After coming to its initial stop, the AV began moving again, approximately 1.83 s after the initial contact between the pedestrian and the AV, to accomplish its outermost lane stopping maneuver.

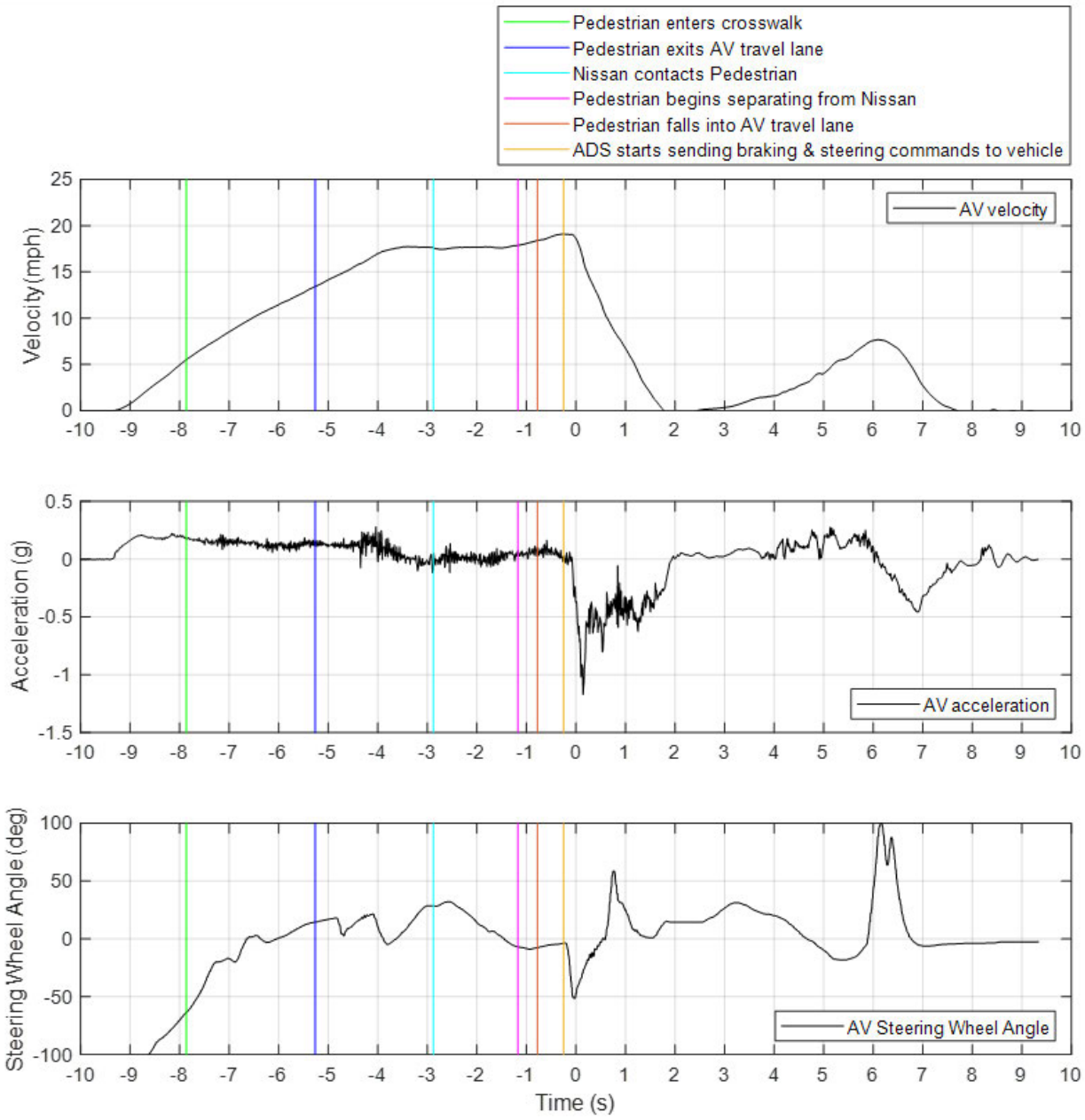


Figure 62. Timeline of events. Time is normalized such that contact between the pedestrian and AV occurs at t = 0 s.

During this maneuver, the AV reached a speed of 7.7 mph (Figure 62) and traveled approximately 20 feet while dragging the pedestrian before reaching its final rest position. As shown in Figure 63, the pedestrian's feet and lower legs were visible in the wide-angle left side camera view from the time of the collision between the pedestrian and the AV through to the final rest position of the AV. The ADS briefly detected the legs of the pedestrian while the pedestrian was under the vehicle, but neither the pedestrian nor the pedestrian's legs were classified or tracked by the ADS after the AV contacted the pedestrian.

Figure 63. View of the pedestrian's leg around the left rear wheel of the AV (white dashed circle annotation added by Exponent) approximately 3.4 s after the AV-pedestrian collision.

A traction control system event was recorded at approximately 3.8 s after the initial contact between the pedestrian and the AV due to the pedestrian physically resisting the motion of the vehicle. An accumulated offset between the wheel rotation of the left-rear wheel relative to the others from the wheel speed sensors led to the AV entering a degraded state approximately 5.8 s after the initial contact between the pedestrian and the AV. This degraded state caused the vehicle to initiate an immediate stop, and the vehicle reached its final point of rest approximately 8.8 s after the initial contact between the pedestrian and the AV (Figure 64).

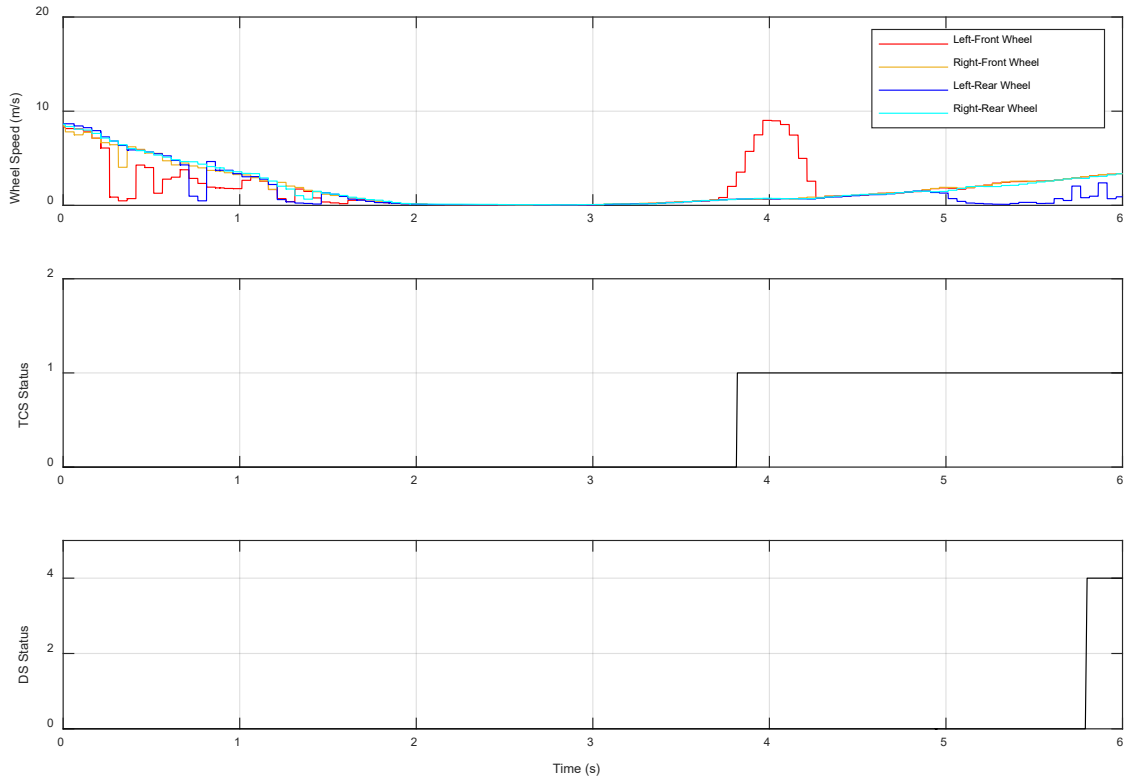


Figure 64. The AV's recorded wheel speeds (top), TCS status (middle), and Degraded State status (bottom) in the 6 seconds after the AV-pedestrian collision occurred.

The AV's collision with the pedestrian was caused by the pedestrian being projected in the AV's path of travel due to the collision with the Nissan Calculations of potential AV stopping distance and human factors analyses indicate that a collision of the AV with the pedestrian may not have been avoidable, even if the ADS had reacted to the collision between the Nissan and the pedestrian. The AV's lack of anticipation of a potential future incursion of the pedestrian into its travel lane was a contributing factor to this incident. Reasonable human drivers would face challenges reacting to the pedestrian being projected into their lane of travel and would likely not have been able to avoid the collision under similar circumstances. This difficulty could be due to violations of expectancy, glare, or A-pillar obstruction, or a combination of these, as well as to a failure to predict the collision of the Nissan with the pedestrian in the adjacent lane and/or the resulting redirection of the pedestrian into their lane of travel. Moreover, reasonable human drivers would not likely have had adequate time to avoid the collision once the pedestrian was struck by the Nissan.

The root cause of the AV's post-collision movement, after the initial brief stop, was the inaccurate determination by the ADS that a side collision had occurred, which led to the triggering of an outermost

lane stop maneuver instead of an emergency stop. Because all non-vehicles are treated in the same manner as a pedestrian with respect to a post-collision response, the intermittent classification of the pedestrian was not a contributing factor to the post-collision response. However, due to the inaccuracy of the object track considered by the collision detection system and the resulting disparity between this track and the pedestrian's actual position, the ADS failed to accurately determine the location of the pedestrian at the time of impact and while the pedestrian was underneath the vehicle. This contributed to the inaccurate side collision determination and the post-collision movement of the AV. When the AV came to an initial stop after the AV-pedestrian collision, the AV was already occupying the outermost lane and therefore, satisfied the location requirement for an outermost lane stop. However, the ADS did not consider this location as an acceptable stopping location because the outermost lane edge was mislabeled in the semantic map. This inaccurate determination by the ADS that it was not already in an acceptable stopping location was a contributing factor to the post-collision movement of the AV. After the AV contacted the pedestrian, an alert and attentive human driver would be aware that an impact of some sort had occurred and would not have continued driving without further investigating the situation.