



December 29, 2017

Rodney Aoki
Manager
Department of Motor Vehicles
Licensing and Operations Division
2415 1st Avenue, Mail Station S441
Sacramento, CA 95818-2806

Re: Waymo Autonomous Vehicle Disengagement Report 2017

Dear Mr. Aoki:

Enclosed please find the Waymo Autonomous Vehicle Disengagement Report covering the period of December 1, 2016 to November 30, 2017.

Sincerely,

A handwritten signature in black ink that reads "Ron medford". The signature is written in a cursive, lowercase style.

Ron Medford
Director of Safety



Disengagement Report

Report on Autonomous Mode Disengagements
For Waymo Self-Driving Vehicles in California
December 2017

Introduction

Waymo, formerly known as the Google self-driving car project, has been developing self-driving technology since 2009. In that time, we've built an extensive testing program that includes test-driving on closed courses, on public roads, and in simulation to build the most experienced driver on the road.

As of the end of November 2017, Waymo has operated vehicles on public roads in autonomous mode for over 4 million miles across more than 20 U.S. cities. For the 12 month period covering this report, Waymo completed 352,545 miles in autonomous mode in California – with the vast majority of the driving on surface streets.

This report covers disengagements following the California DMV definition, which means “a deactivation of the autonomous mode when a failure of the autonomous technology is detected or when the safe operation of the vehicle requires that the autonomous vehicle test driver disengage the autonomous mode and take immediate manual control of the vehicle.” Section 227.46 of Article 3.7 (Autonomous Vehicles) of Title 13, Division 1, Chapter 1, California Code of Regulations.

Waymo has developed a robust process to collect, analyze and evaluate disengages for this report. We set disengagement thresholds conservatively for our public road testing. The vast majority of disengagements are not related to safety. Our test drivers routinely transition into and out of autonomous mode many times throughout the day, and the self-driving vehicle's computer hands over control to the driver in many situations that do not involve a failure of the autonomous technology and do not require an immediate takeover of control by the driver.

To help evaluate the safety significance of disengagements, Waymo employs a powerful simulator program. In Waymo's simulation, our team can “replay” each incident and predict the behavior of our self-driving car if the driver had not taken control of it, as well as the behavior and positions of other road users in the vicinity (such as pedestrians, cyclists, and other vehicles). Our engineers use this data to refine and improve the software to ensure the self-driving car performs safely.

Disengagements provide important feedback that allows us to continually improve our software, introduce new driving features, and upgrade the sensors and hardware on our vehicles. During public road testing, our objective is to gather as much data as possible to enable us to improve our self-driving system, while operating safely. While public road testing is a critical component of building confidence in our vehicles, it's not the only important measure. In addition to Waymo's four million miles on public roads, our testing also includes our growing database of more than 20,000 scenarios tested on our private test track, including evaluating our system's core driving skills and its ability to avoid common pre-crash scenarios, and multiplying those real-world tests with billions more miles tested in simulation. More information on our testing and development program can be found at waymo.com/safetyreport.

Summary of All Reportable Disengagements

Table 1 summarizes all disengagements required to be reported to the DMV, i.e., both those where a failure of the autonomous technology was detected and those involving drivers taking control when required for safe operation. Appendix A shows a brief description of each reportable disengagement.

Table 1: All Reportable Disengagements

Month	Number of disengagements	Autonomous miles on public roads
Dec 2016	11	57,614.8
Jan 2017	7	45,392.2
Feb 2017	4	35,459.7
Mar 2017	4	35,873.2
Apr 2017	10	27,238.7
May 2017	5	16,617.2
Jun 2017	6	13,917.2
Jul 2017	3	19,182.5
Aug 2017	3	20,456.7
Sep 2017	6	22,967.0
Oct 2017	3	27,308.7
Nov 2017	1	30,516.7
Total	63	352,544.6

Table 2, below, provides the breakdown of disengagements by cause. Note that, while we have used, where applicable, the causes mentioned in the DMV rule (weather conditions, road surface conditions, construction, emergencies, accidents or collisions), those causes were infrequent in our experience. Far more frequent were the additional causes we have labeled as unwanted maneuver, perception discrepancy, software discrepancy, hardware discrepancy, incorrect behavior prediction, or other road users behaving recklessly.

Table 2: Disengagements by Cause

Cause	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Total
Disengage for a recklessly behaving road user	0	0	0	0	1	0	0	0	0	0	0	0	1
Disengage for hardware discrepancy	0	0	1	0	6	1	2	1	1	0	1	0	13
Disengage for unwanted maneuver of the vehicle	4	3	1	2	2	1	3	2	0	0	1	0	19
Disengage for a perception discrepancy	6	4	2	2	0	1	0	0	0	0	1	0	16
Disengage for incorrect behavior prediction of	1	0	0	0	1	2	0	0	0	0	0	1	5

other traffic participants													
Disengage for a software discrepancy	0	0	0	0	0	0	1	0	2	6	0	0	9
Total	11	7	4	4	10	5	6	3	3	6	3	1	63

In its listing of possible disengagement causes, the DMV rule asks each manufacturer to state “whether the disengagement was the result of a planned test of the autonomous vehicle.” Currently, all of the autonomous operations we conduct on California public roads are for testing purposes and all of those operations are planned. Accordingly, all disengagements reported here occurred during planned testing of the self-driving cars (SDCs). We assume that, because only testing of autonomous vehicles was permissible on California public roads during the reporting period, all operation of such vehicles on those roads by any entity is considered planned testing and that disengagements occurring during such testing should be reported if the reporting criteria are met.

Table 3, below, provides information on the location of disengagements covered in this report.

Table 3: Disengagements by Location

Location	Dec 2016	Jan 2017	Feb 2017	Mar 2017	Apr 2017	May 2017	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Total
Highway	0	1	2	0	0	1	0	1	0	1	0	0	6
Street	11	6	2	4	10	4	6	2	3	5	3	1	57
Total	11	7	4	4	10	5	6	3	3	6	3	1	63

Miles Driven by Autonomous Vehicles

In the current reporting period, our fleet of SDCs travelled 352,545 miles autonomously in California. Appendix B shows the number of miles each of the SDCs was tested in autonomous mode on public roads each month, as required by the DMV rule.

Time Between Technology Failure and Driver Assumption of Control

The DMV rule requires that our report include in our summary of disengagements the “period of time elapsed from when the autonomous vehicle test driver was alerted of the technology failure and the driver assumed manual control of the vehicle.” This requirement is relevant only to the “technology failure” category of disengagements when the vehicle hands over control to the driver for immediate action, rather than those involving drivers taking control when required for safe operation. Appendix A shows this elapsed time for each disengagement where the data are available. In the vast majority of cases, the driver took control in one second or less after the immediate manual control message was received. The average time of all measurable events was 0.91 seconds.

Appendix A
Summary of Each Reportable Disengagement

Day	Location	Type	Time to Manual	Cause
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Dec 2016	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Dec 2016	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Dec 2016	Street	Safe Operation	-	Disengage for incorrect behavior prediction of other traffic participants
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Dec 2016	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Dec 2016	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Dec 2016	Street	Safe Operation	-	Disengage for a perception discrepancy
Jan 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Jan 2017	Highway	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jan 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jan 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Jan 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Jan 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Jan 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Feb 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Feb 2017	Highway	Failure Detection	1.0s	Disengage for hardware discrepancy
Feb 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Feb 2017	Highway	Safe Operation	-	Disengage for a perception discrepancy
Mar 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Mar 2017	Street	Safe Operation	-	Disengage for a perception discrepancy
Mar 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Mar 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Apr 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Apr 2017	Street	Failure Detection	0.9s	Disengage for hardware discrepancy

Apr 2017	Street	Failure Detection	n/a	Disengage for hardware discrepancy
Apr 2017	Street	Safe Operation	-	Disengage for a recklessly behaving road user
Apr 2017	Street	Failure Detection	1.3s	Disengage for hardware discrepancy
Apr 2017	Street	Failure Detection	1.3s	Disengage for hardware discrepancy
Apr 2017	Street	Failure Detection	0.9s	Disengage for hardware discrepancy
Apr 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Apr 2017	Street	Safe Operation	-	Disengage for incorrect behavior prediction of other traffic participants
Apr 2017	Street	Failure Detection	1.0s	Disengage for hardware discrepancy
May 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
May 2017	Street	Safe Operation	-	Disengage for incorrect behavior prediction of other traffic participants
May 2017	Highway	Failure Detection	0.8s	Disengage for hardware discrepancy
May 2017	Street	Safe Operation	-	Disengage for incorrect behavior prediction of other traffic participants
May 2017	Street	Failure Detection	n/a	Disengage for a perception discrepancy
Jun 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jun 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jun 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Jun 2017	Street	Failure Detection	0.3s	Disengage for hardware discrepancy
Jun 2017	Street	Failure Detection	1.4s	Disengage for hardware discrepancy
Jun 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jul 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jul 2017	Highway	Safe Operation	-	Disengage for unwanted maneuver of the vehicle
Jul 2017	Street	Failure Detection	0.3s	Disengage for hardware discrepancy
Aug 2017	Street	Failure Detection	n/a	Disengage for hardware discrepancy
Aug 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Aug 2017	Street	Failure Detection	1.1s	Disengage for a software discrepancy
Sep 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Sep 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Sep 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Sep 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Sep 2017	Street	Failure Detection	n/a	Disengage for a software discrepancy
Sep 2017	Highway	Failure Detection	1.2s	Disengage for a software discrepancy
Oct 2017	Street	Safe Operation	-	Disengage for unwanted maneuver of the vehicle

Oct 2017	Street	Failure Detection	n/a	Disengage for a perception discrepancy
Oct 2017	Street	Failure Detection	0.3s	Disengage for hardware discrepancy
Nov 2017	Street	Safe Operation	-	Disengage for incorrect behavior prediction of other traffic participants

Appendix B
Autonomous miles on public roads in California
for each car and month

(shows last four digits of car's VIN)¹

Vehicle	***7036	***0779	***5356	***0888	***2177	***5457	***3028	***5048
Dec 2016	2,429.8	3,528.8	3,466.0	3,426.2	1,273.8	2,377.1	1,912.5	0.0
Jan 2017	1,367.6	1,216.1	2,230.1	1,641.6	2,500.9	1,621.2	1,761.9	0.0
Feb 2017	854.9	1,379.3	2,013.9	0.0	0.0	0.0	1,479.2	0.0
Mar 2017	790.8	2,224.1	1,008.6	1,118.9	1,369.9	2,141.3	0.0	1,686.0
Apr 2017	1,924.2	1,945.7	2,247.1	2,413.6	1,910.8	2,560.7	0.0	2,720.1
May 2017	1,575.2	1,602.0	1,989.7	1,624.4	1,023.7	1,914.9	0.0	1,382.2
Jun 2017	62.5	1,055.5	848.2	1,525.9	1,275.0	593.5	0.0	1,406.8
Jul 2017	0.0	107.0	0.0	1,049.8	1,657.3	0.0	0.0	1,593.4
Aug 2017	0.0	309.1	0.0	0.0	56.0	33.9	0.0	56.0
Sep 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	9,005.0	13,367.6	13,803.6	12,800.4	11,067.4	11,242.6	5,153.6	8,844.5

Vehicle	***5517	***5520	***5521	***5522	***5523	***5526	***5527	***5528
Dec 2016	1,310.0	471.4	402.8	0.0	0.0	331.1	1,781.0	1,835.1
Jan 2017	922.7	1,252.7	831.1	437.2	968.5	1,253.6	1,329.7	213.5
Feb 2017	867.9	1,043.6	975.0	1,161.9	1,532.7	1,235.7	576.0	0.0
Mar 2017	1,087.6	661.5	1,044.3	1,518.7	577.4	1,220.0	485.6	0.0
Apr 2017	0.0	402.3	626.8	964.5	678.3	768.5	0.0	0.0
May 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

¹ In addition to the vehicles listed in this appendix, 34 other Waymo vehicles had testing permits for some or all of the reporting period but did not operate in autonomous mode on public roads in California during that period.

Nov 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	4,188.2	3,831.5	3,880.0	4,082.3	3,756.9	4,808.9	4,172.3	2,048.6

Vehicle	***5529	***5530	***5531	***5532	***5534	***5536	***5537	***5538
Dec 2016	1,813.2	1,426.4	1,382.9	1,390.2	1,770.4	857.8	1,711.9	1,878.2
Jan 2017	1,458.8	1,511.5	968.5	0.0	990.9	1,140.6	1,250.2	594.8
Feb 2017	1,088.3	590.1	705.6	0.0	829.7	389.6	288.9	1,460.7
Mar 2017	1,009.0	235.8	1,010.1	0.0	775.8	1,293.7	253.1	873.4
Apr 2017	331.1	61.6	859.1	0.0	895.8	187.9	403.8	0.0
May 2017	0.0	9.6	0.0	0.0	0.0	0.0	0.0	0.0
Jun 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	5,700.4	3,835.0	4,926.2	1,390.2	5,262.6	3,869.6	3,907.9	4,807.1

Vehicle	***5539	***5540	***5541	***5542	***5543	***5544	***5545	***5546
Dec 2016	1,470.7	1,549.2	1,781.7	1,607.6	1,596.0	1,971.0	632.2	1,039.7
Jan 2017	494.6	1,327.7	1,018.7	1,244.6	384.4	1,222.8	474.9	1,181.5
Feb 2017	1,351.5	1,215.7	1,362.9	1,206.8	968.0	652.2	1,225.4	271.1
Mar 2017	607.4	301.8	1,766.0	440.5	555.3	647.4	1,234.8	327.0
Apr 2017	0.0	274.3	75.9	0.0	0.0	193.5	1,047.4	725.6
May 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.3
Jun 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	3,924.2	4,668.7	6,005.2	4,499.5	3,503.7	4,686.9	4,614.7	3,546.2

Vehicle	***5547	***5548	***5549	***5550	***5551	***5552	***5553	***5554
Dec 2016	531.5	852.5	0.0	721.8	0.0	837.3	0.0	1,163.9

Jan 2017	951.4	949.8	787.0	0.0	607.5	1,311.3	286.0	1,176.9
Feb 2017	853.3	153.2	905.1	0.0	993.0	307.5	1,399.1	816.7
Mar 2017	83.4	0.0	543.2	0.0	1,270.1	0.0	1,154.9	168.1
Apr 2017	0.0	0.0	0.0	0.0	0.0	0.0	409.8	0.0
May 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jul 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aug 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Sep 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Nov 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	2,419.6	1,955.5	2,235.3	721.8	2,870.6	2,456.1	3,249.8	3,325.6

Vehicle	***5555	***5556	***5558	***5559	***4642	***4643	***4637	***4641
Dec 2016	1,533.3	939.8	1,385.1	1,224.9	0.0	0.0	0.0	0.0
Jan 2017	1,330.9	951.7	1,328.2	898.6	0.0	0.0	0.0	0.0
Feb 2017	1,245.7	953.0	181.3	571.0	0.0	354.2	0.0	0.0
Mar 2017	1,075.4	514.1	919.1	1,260.3	0.0	259.7	0.0	359.1
Apr 2017	424.4	581.9	43.9	582.6	53.1	57.4	0.0	487.0
May 2017	0.0	0.0	0.0	0.0	1,095.6	550.7	0.0	448.4
Jun 2017	0.0	0.0	0.0	0.0	1,524.6	375.3	0.0	0.0
Jul 2017	0.0	0.0	0.0	0.0	1,331.8	0.0	0.0	0.0
Aug 2017	0.0	0.0	0.0	0.0	2,317.4	0.0	0.0	0.0
Sep 2017	0.0	0.0	0.0	0.0	504.5	0.0	0.0	0.0
Oct 2017	0.0	0.0	0.0	0.0	2,232.0	0.0	750.2	1,118.9
Nov 2017	0.0	0.0	0.0	0.0	96.3	0.0	1,535.2	1,503.2
Total	5,609.7	3,940.5	3,857.6	4,537.4	9,155.3	1,597.3	2,285.4	3,916.6

Vehicle	***4652	***4635	***4667	***4680	***4691	***4669	***4683	***4701
Dec 2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jan 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr 2017	380.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May 2017	376.4	0.0	2.5	769.6	0.0	959.2	813.6	0.0

Jun 2017	0.0	0.0	591.4	149.0	0.0	182.3	72.8	0.0
Jul 2017	0.0	6.0	0.0	0.0	0.0	0.0	0.0	4.5
Aug 2017	0.0	606.1	0.0	0.0	0.0	0.0	0.0	0.0
Sep 2017	0.0	17.0	0.0	0.0	0.0	0.0	0.0	0.0
Oct 2017	791.3	0.0	0.0	0.0	986.0	0.0	0.0	0.0
Nov 2017	1,297.0	0.0	0.0	0.0	1,951.5	0.0	0.0	0.0
Total	2,844.7	629.1	593.9	918.6	2,937.5	1,141.5	886.4	4.5

Vehicle	***4672	***4676	***4686	***4679	***4651	***4690	***4640	***4674
Dec 2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jan 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May 2017	30.7	0.0	2.8	444.7	0.0	0.0	0.0	0.0
Jun 2017	642.2	0.0	721.7	1,209.7	796.6	0.0	203.9	387.6
Jul 2017	0.0	0.0	2,016.5	337.2	875.2	1,703.6	1,220.8	334.6
Aug 2017	0.0	0.0	313.7	0.0	0.0	2,321.2	0.0	0.0
Sep 2017	0.0	0.0	185.5	0.0	0.0	2,321.5	0.0	0.0
Oct 2017	0.0	149.4	1,937.2	0.0	0.0	2,343.8	0.0	0.0
Nov 2017	0.0	733.5	317.3	0.0	0.0	2,832.8	0.0	0.0
Total	672.9	882.9	5,494.7	1,991.6	1,671.8	11,522.9	1,424.7	722.2

Vehicle	***4699	***4700	***4649	***4663	***4666	***4634	***4703	***4697
Dec 2016	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jan 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Feb 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mar 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Apr 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
May 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Jun 2017	0.0	270.3	10.4	12.0	0.0	0.0	0.0	0.0
Jul 2017	523.2	560.0	721.1	1,124.1	2,096.1	863.4	173.3	0.0
Aug 2017	1,799.5	0.0	0.0	2,822.6	2,795.6	0.0	809.1	779.4
Sep 2017	2,082.3	0.0	0.0	2,841.6	3,441.9	0.0	2,403.7	2,424.5
Oct 2017	1,857.8	0.0	0.0	2,893.7	2,886.5	0.0	2,779.2	129.7

Nov 2017	2,506.3	0.0	0.0	2,781.2	2,186.3	0.0	2,007.6	2,861.6
Total	8,769.1	830.3	731.5	12,475.2	13,406.4	863.4	8,172.9	6,195.2

Vehicle	***4698	***4658	***4708
Dec 2016	0.0	0.0	0.0
Jan 2017	0.0	0.0	0.0
Feb 2017	0.0	0.0	0.0
Mar 2017	0.0	0.0	0.0
Apr 2017	0.0	0.0	0.0
May 2017	0.0	0.0	0.0
Jun 2017	0.0	0.0	0.0
Jul 2017	627.9	55.8	199.9
Aug 2017	2,511.6	2,505.8	419.7
Sep 2017	3,415.9	3,328.6	0.0
Oct 2017	3,117.7	3,335.3	0.0
Nov 2017	3,208.2	3,453.5	1,245.2
Total	12,881.3	12,679.0	1,864.8