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**DATE:**

December 31, 2017

**TO:**

**California Department of Motor Vehicles**

**ATTN: Mr. Rodney Aoki, Manager**

Licensing and Operations Division

2415 1st Ave., Mail Station S441

Sacramento, CA 95818

**RE: Autonomous Vehicle Disengagement Report for public road testing in California**

Dear Mr. Aoki:

Enclosed, please find the first Zoox report on autonomous vehicle disengagements for its California public road testing program. This report is submitted pursuant to California Code of Regulations, Title 13, Article 3.7, Section 227.46 and covers the reporting period from March 2016 through November 30, 2017.

Sincerely,

A handwritten signature in black ink that reads "Mark R. Rosekind". The signature is written in a cursive, flowing style.

**Mark R. Rosekind, Ph.D.**

Chief Safety Innovation Officer

Enclosures

DECEMBER 31, 2017



# ZOOX IS DRIVING WHERE IT MATTERS – CITIES.

- 95% OF PUBLIC AUTONOMOUS MILES DRIVEN IN DOWNTOWN SAN FRANCISCO
- 430 MILES FOR EVERY ONE DISENGAGEMENT IN NOVEMBER 2017

Zoox is building a scalable, next-generation autonomous transportation solution for cities that will enhance safety, mobility, and sustainability. In the U.S., 94 percent of crashes are caused by human choice or error. Specifically, in San Francisco, every year about 30 people lose their lives and over 200 more are seriously injured while traveling on city streets, as a result of these human factors. Autonomous mobility offers an opportunity to save lives and prevent injuries and crashes on our roadways.

Cities are complex and dynamic. Zoox is creating an autonomous system with novel vehicles designed to safely share the road with pedestrians, cyclists, public transit, emergency vehicles, and other road users. On the streets of San Francisco, our test system often sees more in 100 feet than a vehicle might experience over 100 miles on a freeway. During a recent 30-minute drive in downtown San Francisco, our system detected 503 pedestrians, 188 bicyclists and 2,741 cars.

In 2017, after development and maturation of our advanced self-driving-system on a private test track, Zoox expanded to autonomous driving on California public roads, where we drove 2,244 miles. Of those public road miles, 95% were driven in downtown San Francisco. At no time when our test fleet was in autonomous-mode were they involved in an incident; at Zoox 'safety first' is our foundation. Over the course of this reporting period (our first), we increased our miles per disengagement (MPD). We ended this period with 430 miles for every one disengagement in this dense urban environment.

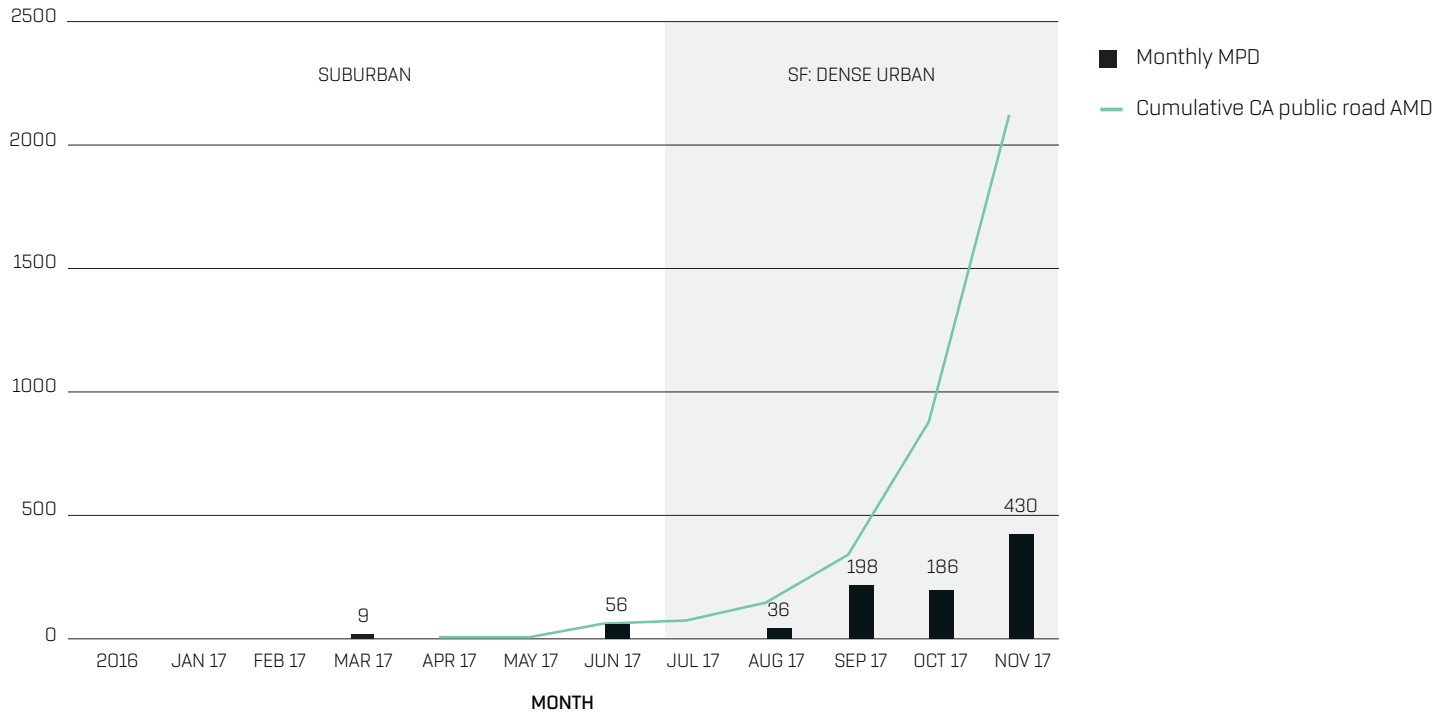
This report provides data on Zoox's 2017 progress driving autonomous miles on public roads in California. All disengagements took place during planned tests.

# ZOOX PROGRESS



Over time, both the number of autonomous miles Zoox has driven on California roads and the number of miles driven between disengagements has increased.

## ZOOX CALIFORNIA PUBLIC ROAD AUTONOMOUS MILES DRIVEN (AMD) AND MILES PER DISENGAGEMENT (MPD)



# APPENDIX 1



## TOTAL NUMBER OF ZOOX FLEET MILES DRIVEN AUTONOMOUSLY ON CALIFORNIA PUBLIC ROADS FOR EACH MONTH OF THE REPORTING PERIOD.

VEHICLE VIN	MAR 16-DEC 16	JAN 17	FEB 17	MAR 17	APR 17	MAY 17	JUN 17	JUL 17	AUG 17	SEP 17	OCT 17	NOV 17
-8917	0	0	0	0	0	0	0	0	0	0	0	0
-6725	0	0	0	0	0	0	0	0	70	38.0	277	94.7
-7703	0	10.5	0	44.1	0	0	1.5	0	1.2	21.9	157.2	210.8
-7625	0	0	0	0	0	0	0	0	0	71.3	229.5	262.0
-6144	0	0	0	0	0	0	0	0.5	11.7	32.6	63.8	248.6
-5942	0	0	0	0	0	0	19.2	6.8	11.4	0.2	44.4	156.4
-9989	0	0	0	0	2.2	0	35.4	0	1.9	0	0	191.9
-5009	0	0	0	0	0	0	0	0	0	0	0	0
-5016	0	0	0	0	0	0	0	0	0	0	0	0
-8642	0	0	0	0	0	0	0	4.9	39.2	34.7	37.2	124.2
-0015	0	0	0	0	0	0	0	0	0	0	0	0

# APPENDIX 2

## DESCRIPTIONS OF DISENGAGEMENTS FROM AUTONOMOUS MODE\*

DATE	LOCATION & WEATHER CONDITIONS	FACTS	TIME TO DRIVER INTERVENTION
Nov 17	Dense Urban Street, clear weather	Planning discrepancy	-
Nov 17	Dense Urban Street, clear weather	Planning discrepancy	-
Nov 17	Dense Urban Street, clear weather	Perception discrepancy	-
Oct 17	Dense Urban Street, clear weather	Planning discrepancy	-
Oct 17	Dense Urban Street, clear weather	Planning discrepancy	-
Oct 17	Dense Urban Street, clear weather	Hardware discrepancy	-
Sep 17	Dense Urban Street, clear weather	Planning discrepancy	-
Aug 17	Dense Urban Street, clear weather	Hardware discrepancy	-
Aug 17	Dense Urban Street, clear weather	Planning discrepancy	-
Jun 17	Suburban Street, clear weather	Planning discrepancy	-
Mar 17	Suburban Street, clear weather	Hardware discrepancy	0.7 sec
Mar 17	Suburban Street, clear weather	Hardware discrepancy	0.6 sec
Mar 17	Suburban Street, clear weather	Hardware discrepancy	0.8 sec
Mar 17	Suburban Street, clear weather	Planning discrepancy	-

\* Dash (-) indicates safety driver took immediate manual control.