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RESEARCH NOTE · AUTONOMOUS MOBILITY · NOVEMBER 2026

# Driverless, by the Numbers

Robotaxis have scale. Supervised FSD has customers. Only one publishes period-specific exposure that can be matched to federal crash filings — the real story of 2026.

INSIDE


01 Two experiments, one road
02 What the federal data can say
03 Waymo: the only real rate
04 Tesla: scale, limited comparability
05 The comparison problem
A–C Data appendix & method


**220M+**
WAYMO AUTONOMOUS MILES ANALYSED

**1,595**
DRIVERLESS INCIDENT REPORTS ON FILE

**2,211**
LEVEL 2 REPORTS FILED BY TESLA ALONE

**1.74M**
ACTIVE FSD SUBSCRIPTIONS, Q3 2026

THE ARGUMENT

# Two vehicles, one road, and a data system built for neither

In 2026 the driverless story stops being a pilot story. Waymo now serves more than a dozen US metros and has accumulated more than 220 million autonomous miles. Tesla is carrying paying passengers in Austin and has quietly become the fourth-largest filer of federal driverless crash reports.

But the two businesses are measured in completely different currencies. Waymo publishes miles, so its crash rate can be set against a human benchmark — and it wins every comparison it has published. Tesla's Robotaxi filings lack a period-matched mileage denominator, so the federal filing count cannot be read as a rate.

This report takes the 2026 federal filing data seriously: what it shows, what it hides, and what a careful reader should refuse to conclude from it.

## FIVE FINDINGS

1. **Waymo's published per-mile record beats humans.** Depending on the yardstick, 68% to 94% fewer crashes than human drivers over the same roads and period.
2. **Tesla files 86% of all Level 2 reports and 3.6% of driverless reports.** Neither number is a rate, and the second is not evidence of safety.
3. **88% of Level 2 reports carry an unknown injury severity**, and 51% an unknown crash partner. The field is close to unusable for outcome research.
4. **The June 2025 rule change coincided with** roughly doubled ADS filings; the data cannot show whether vehicle behaviour changed.
5. **Only one operator publishes period-specific ADS** miles that can be aligned with SGO filings. Others' counts remain counts.

### HOW TO USE THIS REPORT

Every figure traces to a named file in **materials/**. Appendix C lists the source set and the method. Where a comparison is not like-for-like, the page says so in the body text.

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THE DASHBOARD

# Six numbers that frame the year

The gap between the first two rows is the gap this report is about: one operator measures itself in the unit that matters, the other in the unit that flatters.

**220M+**
**Fully autonomous miles analysed**
Waymo, through March 2026

**94%**
**Fewer serious or fatal injury crashes**
Versus the human benchmark

**68%**
**Fewer police-reportable crashes**
IIHS, per vehicle mile, four metros

**1,595**
**Driverless incident reports**
NHTSA SGO, Apr 2025 – Sep 2026

**81%**
**Filed by a single operator**
Waymo's share of all ADS reports

**2,211**
**Level 2 reports filed by Tesla**
86% of all L2 ADAS reports

## WHAT THE FEDERAL FILE ACTUALLY CONTAINS

- **1,595 reports, 1,552 distinct incidents.** 44 rows are re-versions of a report already counted.
- **19 reporting entities.** Waymo 1,292; Avride 91; Zoox 79; Tesla 57; May Mobility 21.
- **82.9% property damage only.** 2 fatalities and 4 serious-injury reports in the entire file — all Waymo.
- **97.7% inside the operational design domain.** 34 reports are redacted as confidential business information.

## WHAT THE LEVEL 2 FILE ACTUALLY CONTAINS

- **2,574 reports, 2,424 distinct incidents**, across 27 vehicle makes.
- **88.0% carry an "Unknown" injury severity** — the field is effectively unusable for rate work.
- **50.8% carry an "Unknown" crash partner.**
- **35 fatalities** are recorded, 28 of them on Tesla vehicles.

## THE TWO FEDERAL FILES, SIDE BY SIDE

| PROPERTY | ADS (DRIVERLESS) | LEVEL 2 ADAS (SUPERVISED) |
|---|---|---|
| **Reports in current file** | 1,595 | 2,574 |
| **Distinct incidents** | 1,552 | 2,424 |
| **Reporting entities / makes** | 19 entities | 27 makes |
| **Incident-date span** | Apr 2025 – Sep 2026 | Jan 2023 – Sep 2026 |
| **Injury severity "Unknown"** | 1.6% | 88.0% |
| **Crash partner "Unknown"** | 0.0% | 50.8% |
| **SGO exposure data** | Waymo by period; Tesla cumulative | None |

Source: NHTSA SGO 2021-01 current release. 'Unknown' shares computed over all reports in each file.

01

# Two experiments, one road




Photo: 9yz / Wikimedia Commons (CC BY 4.0)

The same intersection, the same weather, the same pedestrians — and two completely different contracts with the person behind the wheel.

## Level 2 vs. Level 4

THE DIVIDING LINE THAT DECIDES WHETHER A CRASH COUNT CAN EVER BECOME A RATE.

CHAPTER ONE · THE DIVIDE

# Only one publishes enough exposure for an independent per-mile safety comparison

A Level 2 system is a driver aid with a legally responsible human. A Level 4 system is the driver.

| LEVEL | NAME | WHAT IT MEANS FOR SAFETY DATA |
|---|---|---|
| 0–1 | **No automation / driver assistance** | The driver does everything, or one dimension is automated at a time. |
| 2 | **Partial automation** THIS REPORT | Both dimensions automated; a human must monitor and take over. |
| 3 | **Conditional automation** RARE | The system drives; a human must answer a takeover request. |
| 4 | **High automation** THIS REPORT | No human supervision inside its design domain. The robotaxi category. |
| 5 | **Full automation** | No human input under all conditions. Does not yet exist. |

Source: SAE J3016 (2018) §3; Waymo safety data (Jun 2026), service areas (Nov 2026); Tesla Robotaxi (Nov 2026), Q4 FY2025 p.11, Q3 2026 p.7; Mercedes-Benz (Jun 2024).

## WHO IS ACTUALLY ON THE ROAD

| SYSTEM | LVL | SELECTED MARKETS |
|---|---|---|
| Waymo | 4 | Phoenix, San Francisco, Los Angeles, Austin, Atlanta |
| Tesla Robotaxi | 4 | Austin, Dallas, Fort Worth, Houston, Miami, Orlando, Tampa |
| Zoox | 4 | Las Vegas, San Francisco, Austin |
| Mercedes DRIVE PILOT | 3 | Nevada and California only |
| Tesla FSD (Supervised) | 2 | Consumer fleet, 49 states |
| GM Super Cruise · Ford BlueCruise · Rivian Autonomy+ | 2 | Consumer fleet |

For ADS, Waymo publishes period-specific miles; Tesla Robotaxi reports only cumulative miles.

**WHY THIS MATTERS FOR THE DATA**

A Level 2 filing tells you a crash happened while a partly automated system was running — not that the system was driving. A Level 4 filing describes a vehicle that was, by definition, driving itself.

02

# What the federal data can say




Photo: 9yz / Wikimedia Commons (CC BY 4.0)

One Standing General Order produces two datasets that are not measuring the same thing, in the same way, for the same purpose.

## 2 files · 4,169 reports

THE CURRENT ADS AND LEVEL 2 FILES, COMBINED.

CHAPTER TWO · METHOD

# How to read the NHTSA data

The Standing General Order is a defect-detection instrument, not a statistical survey. Five properties of the data change every number that follows.

## THE FIVE CAVEATS

1. **Two different reporting duties.** The order treats ADS (Level 3–5) and Level 2 ADAS differently. Their files are not two views of one population.
2. **No denominator.** Manufacturers report crashes, not miles, vehicles or hours. Nothing in the file is normalised. A rising count can mean more driving, more cars, or worse driving — the data cannot tell you which.
3. **One crash, several reports.** A single incident can generate an initial filing, a 5-day report, a monthly report and updates. We de-duplicate on *Same Incident ID* and keep the latest *Report Version*.
4. **Redaction is pervasive.** Addresses, narratives, automation versions and ODD status are frequently withheld as confidential business information.
5. **The threshold moved.** The third amended order took effect on 16 June 2025 and re-based what counts as reportable. Pre- and post-2025 series are not directly comparable.

### WORKED EXAMPLE: ONE CRASH, FIVE REPORTS

Report **31101-13612** appears five times in the ADS file — versions 1 through 5, filed by Avride between December 2025 and January 2026. Version 1 records no injury; version 3 records a minor injury without hospitalisation; the final version records property damage. Counting rows gives five crashes. Counting incidents gives one.

### THE RULE WE APPLY THROUGHOUT

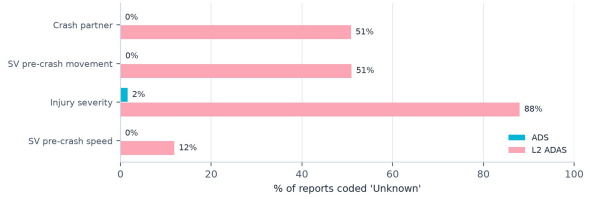
No crash count is ever compared across companies as if it were a rate. Where a denominator exists — Waymo's published miles — we use it. Where it does not, we say so.

## WHAT GETS WITHHELD

| FIELD | ADS REDACTED | L2 REDACTED |
|---|---|---|
| Automation Feature Version | 63 | 2,202 |
| Operating Entity | 0 | 0 |
| Address | 1,393 | 2,271 |
| Narrative | 30 | 2,290 |
| Within ODD? | 34 | 2,274 |

Source: NHTSA SGO 2021-01 incident report files, ADS and ADAS L2, current release. Counts are reports whose field contains a redaction marker.

## HOW MUCH OF THE FILE IS UNKNOWN




Source: NHTSA SGO current release, ADS (n = 1,595) and ADAS L2 (n = 2,574). Share of reports coded 'Unknown' on each field.

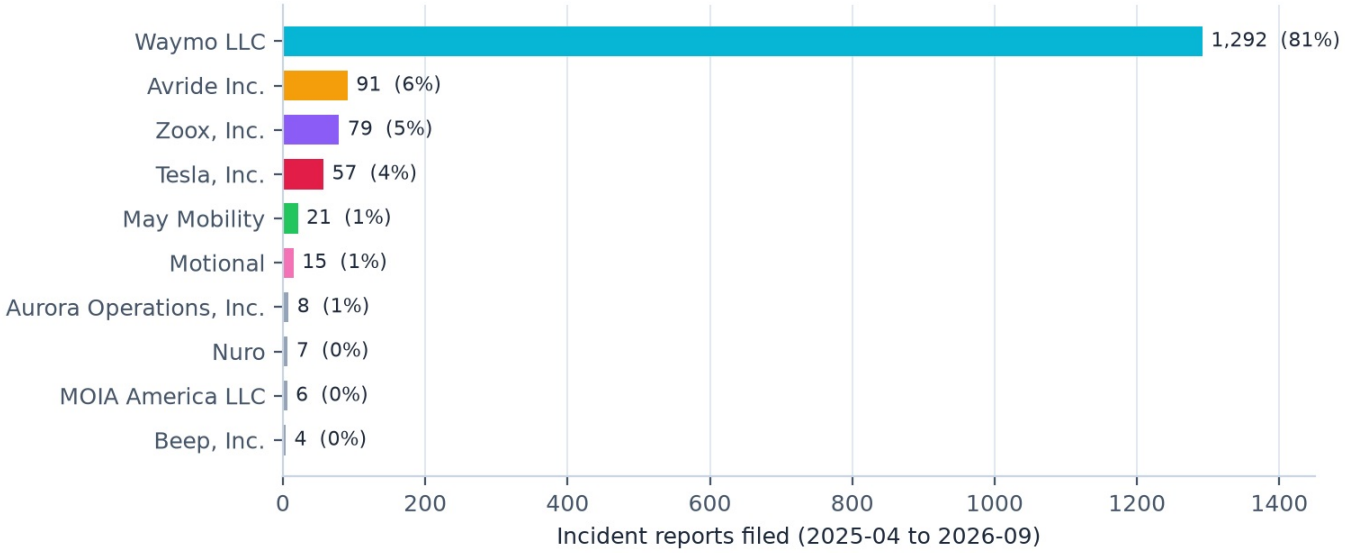
### REPORTING ASYMMETRY

Tesla alone files 88.0% of Level 2 reports with an "Unknown" injury severity, while Toyota, Kia, Subaru, Honda and Mercedes file almost none. That is a difference in detection and classification, not necessarily in crash outcomes.

CHAPTER TWO · THE FILINGS

# One operator files four out of five driverless reports

Waymo's 1,292 reports are 81% of the current ADS file. That concentration is not a safety finding — it is a reporting finding, and it shapes everything else in the dataset.




Source: NHTSA SGO 2021-01 ADS incident reports (current release, incident dates Apr 2025 – Sep 2026); n = 1,595.

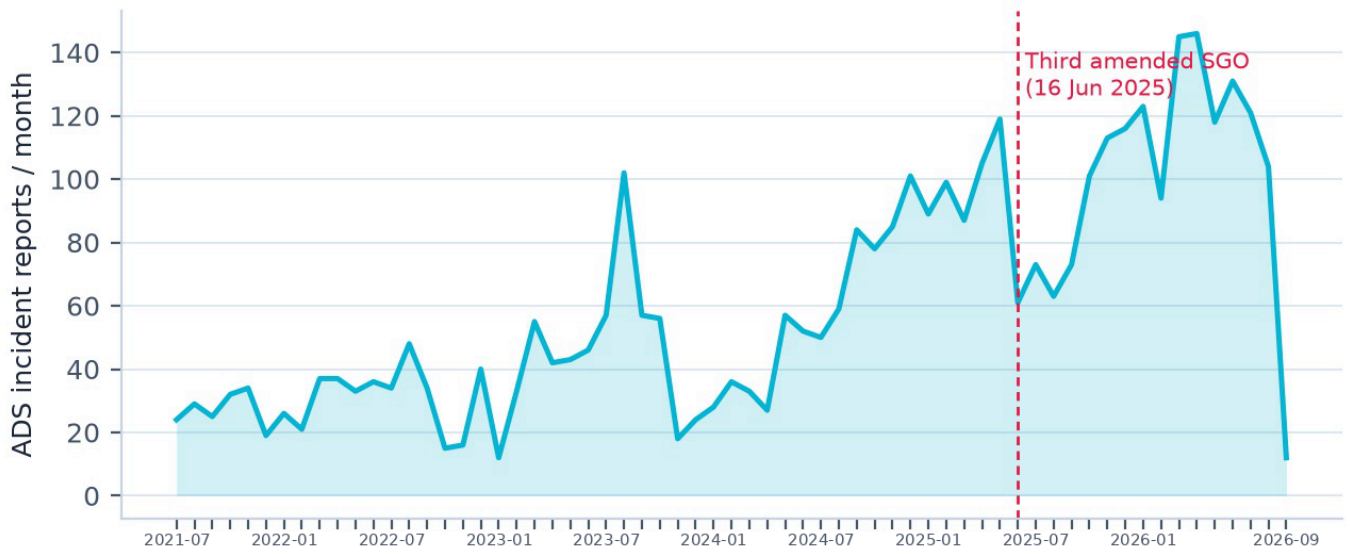
| REPORTING ENTITY | REPORTS | INCIDENTS | SHARE | ANY INJURY | SERIOUS / FATAL |
|---|---|---|---|---|---|
| Waymo LLC | 1,292 | 1,283 | 81% | 132 | 6 |
| Avride Inc. | 91 | 83 | 6% | 5 | 0 |
| Zoox, Inc. | 79 | 78 | 5% | 11 | 0 |
| Tesla, Inc. | 57 | 36 | 4% | 5 | 0 |
| May Mobility | 21 | 20 | 1% | 4 | 0 |
| Motional | 15 | 15 | 1% | 2 | 0 |
| Aurora Operations, Inc. | 8 | 8 | 1% | 1 | 0 |
| Nuro | 7 | 7 | 0% | 0 | 0 |
| MOIA America LLC | 6 | 5 | 0% | 0 | 0 |
| Beep, Inc. | 4 | 4 | 0% | 0 | 0 |

Source: as above. 'Any injury' counts reports coded Minor, Moderate or Serious with or without hospitalisation. 'Serious / fatal' counts Serious W/ Hospitalization and Fatality.

CHAPTER TWO · THE TIME SERIES

# The 2025 jump coincides with a rule change; safety impact is unknown.

Monthly driverless filings roughly doubled after the third amended order took effect in June 2025. Reading that as a deterioration in safety would be exactly the error the data invites.




Source: NHTSA SGO 2021-01 ADS archive (Jul 2021 – Jun 2025) spliced to the current release (Jun 2025 – Sep 2026); n = 3,645 reports.

## WHAT ACTUALLY CHANGED

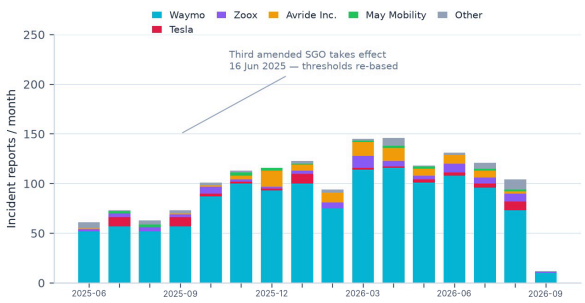
The April 2025 amendment changed deadlines and reporting rules. It narrowed which incidents qualified and added a property-damage threshold for less severe ADS crashes, bringing the criteria closer to police standards. Pre/post counts are not directly comparable.

The composition changed too. Before June 2025 the file was dominated by Waymo and Cruise-era programmes; afterwards it broadens to 19 entities, including Avride, Zoox, May Mobility and — from July 2025 — Tesla.

### HOW TO READ A TREND LINE ACROSS A RULE CHANGE

Treat the pre-2025 and post-2025 segments as two different series joined at a documented break. The archive file and the current file are separate NHTSA releases with different schemas — the archive, for instance, uses a five-point injury scale where the current file uses nine categories.

## THE CURRENT REGIME, MONTH BY MONTH

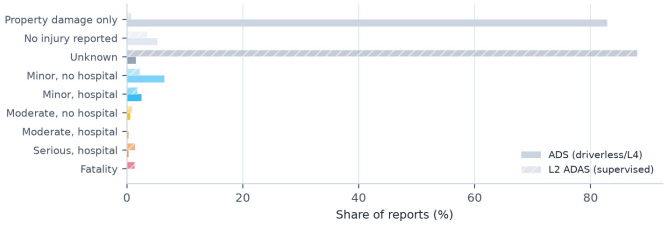



Source: current ADS release; incident months Jun 2025 – Sep 2026. September 2026 is partial (reports received through 15 Sep 2026).

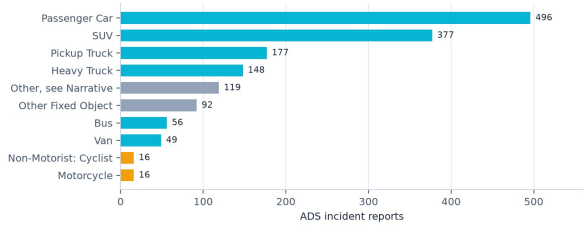
CHAPTER TWO · THE SHAPE OF A CRASH

# Mostly metal, occasionally a person

Eighty-three per cent of driverless reports are property damage with no injury. The 42 that involve a pedestrian, cyclist, motorcyclist or scooter are the ones that matter most — and they are the ones the dataset is worst at explaining.




Source: NHTSA SGO ADS current release, n = 1,595. Severity as alleged, not adjudicated.




Source: as above. Amber bars are vulnerable road users.

| HIGHEST INJURY SEVERITY ALLEGED | REPORTS | SHARE |
|---|---|---|
| Property Damage. No Injured Reported | 1,322 | 82.9% |
| Minor W/O Hospitalization | 104 | 6.5% |
| No Injured Reported | 84 | 5.3% |
| Minor W/ Hospitalization | 40 | 2.5% |
| Unknown | 25 | 1.6% |
| Moderate W/ Hospitalization | 9 | 0.6% |
| Moderate W/O Hospitalization | 5 | 0.3% |
| Serious W/ Hospitalization | 4 | 0.3% |
| Fatality | 2 | 0.1% |

| CRASH PARTNER | REPORTS | SHARE |
|---|---|---|
| Passenger Car | 496 | 31.1% |
| SUV | 377 | 23.6% |
| Pickup Truck | 177 | 11.1% |
| Heavy Truck | 148 | 9.3% |
| Other, see Narrative | 119 | 7.5% |
| Other Fixed Object | 92 | 5.8% |
| Bus | 56 | 3.5% |
| Van | 49 | 3.1% |
| Non-Motorist: Cyclist | 16 | 1.0% |

| VULNERABLE ROAD USER | REPORTS |
|---|---|
| Pedestrian | 4 |
| Cyclist | 16 |
| Scooter / skateboard | 6 |
| Motorcyclist | 16 |
| **Total** | **42** |

**THE NUMBER TO HOLD ON TO**

**42 reports** — 2.6% of the file — involve a non-motorist or a motorcyclist. That is the population where a single failure is most consequential, and it is far too small to support a rate for any individual operator.

03

# Waymo: the only real rate




Photo: Dllu / Wikimedia Commons (CC BY-SA 4.0)

One operator publishes the denominator. That single decision turns a filing count into a safety statistic — and the statistic is extraordinary.

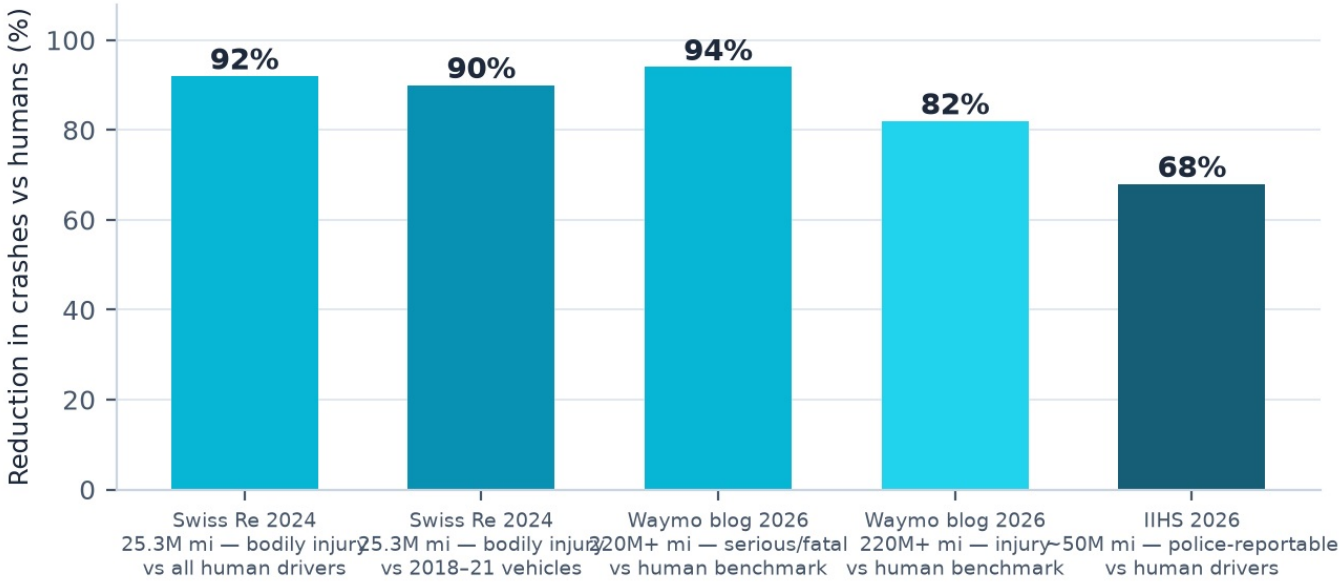
**68% – 94%**

FEWER CRASHES THAN HUMAN DRIVERS, DEPENDING ON THE YARDSTICK.

CHAPTER THREE · THE BENCHMARK

# Waymo's benchmarks show lower crash rates

Four studies use different methods and denominators; three are company-affiliated, while IIHS is independent. Reductions vary by outcome and benchmark.




Source: Swiss Re / Waymo (Nov 2024); Waymo safety data blog (24 Jun 2026); IIHS (23 Jul 2026). Each bar is a different metric — see table below.

| STUDY | DATE | MILES | REDUCTION |
|---|---|---|---|
| Swiss Re / Waymo (insurance claims) | Nov 2024 | 25.3M | 92% |
| Waymo safety data (blog) | Jun 2026 | 220M+ | 94% |
| IIHS (police-reportable crashes) | Jul 2026 | ~50M | 68% |
| Waymo / Swiss Re earlier study (via CRS R48605) | 2023 | 7M+ | 85% |

Source: as above. 'Reduction' is each study's headline injury figure; the Swiss Re row is versus the overall driving population.

## WHAT THE SWISS RE MODEL EXPECTED

| BENCHMARK | PROPERTY DAMAGE | BODILY INJURY |
|---|---|---|
| All human drivers — expected claims | 78 | 26 |
| 2018–2021 vehicles — expected claims | 63 | 21 |
| **Reduction vs all human drivers** | **88%** | **92%** |

Expected claim counts for the same 25.3 million miles. Waymo's two bodily injury claims are **0.8%** of the 241 collisions it reported to NHTSA — a claim and a reportable crash are different objects.

> **"Waymo has reached the point where it is driving enough miles to make direct comparisons to human drivers on crash rates."**
>
> CAROL FLANNAGAN, UMTRI — JUNE 2026

CHAPTER THREE · THE FINE PRINT

# Why 68% and 94% are both true

The three studies answer different questions. The gap between them is not a contradiction — it is a lesson in what a denominator does.

| STUDY | WHAT IS COUNTED | DENOMINATOR | WHAT IT LEAVES OUT |
|---|---|---|---|
| **Swiss Re / Waymo** Nov 2024 | Insurance claims: property damage and bodily injury, across all parties | 25.3M fully autonomous miles vs. expected claims for the same miles | Only crashes severe enough to generate a claim. Small scope: five geographies at the time. |
| **Waymo blog** Jun 2026 | Crashes causing serious or fatal injury; airbag-deployment crashes; any injury crash | >220M autonomous miles vs. a human benchmark for the same roads and period | Company-authored. The human benchmark is modelled, not observed on the same fleet. |
| **IIHS** Jul 2026 | Only crashes a reasonable person would report to police | ~50M driverless miles vs. ~222 billion human miles in four metros | Excludes ~78% of the 736 public-road crashes as not police-reportable. Austin result was 4% worse than humans on a small sample. |

## THE DENOMINATOR IS THE FINDING

After removing duplicates, off-public-road events, cases where automation was not engaged, and events that were not real crashes (about a quarter of initial reports), IIHS identified 736 public-road crashes with automation engaged. Of those, 159 (22%) were likely police-reportable.

That work is not a criticism of the SGO. It is a description of what it takes to turn a compliance register into a measurement.

> **"The present data collection system isn't good enough to allow continuous monitoring of a large-scale expansion."**
>
> DAVID HARKEY, PRESIDENT, IIHS — JULY 2026

**READ THIS BEFORE QUOTING ANY WAYMO NUMBER**

The 94% figure compares Waymo with a *modelled* human benchmark for the same roads and period. The 68% figure compares Waymo with *observed* human crash data, restricted to police-reportable crashes. They are not interchangeable, and neither is a controlled trial.

04

# Tesla: scale with limited comparability



Photo: Daniel Lu (dllu) / Wikimedia Commons (CC BY-SA 4.0)

15.5 billion supervised miles. Nearly two million unsupervised ones.
Tesla publishes FSD collision rates, but not the raw data for independent audit.

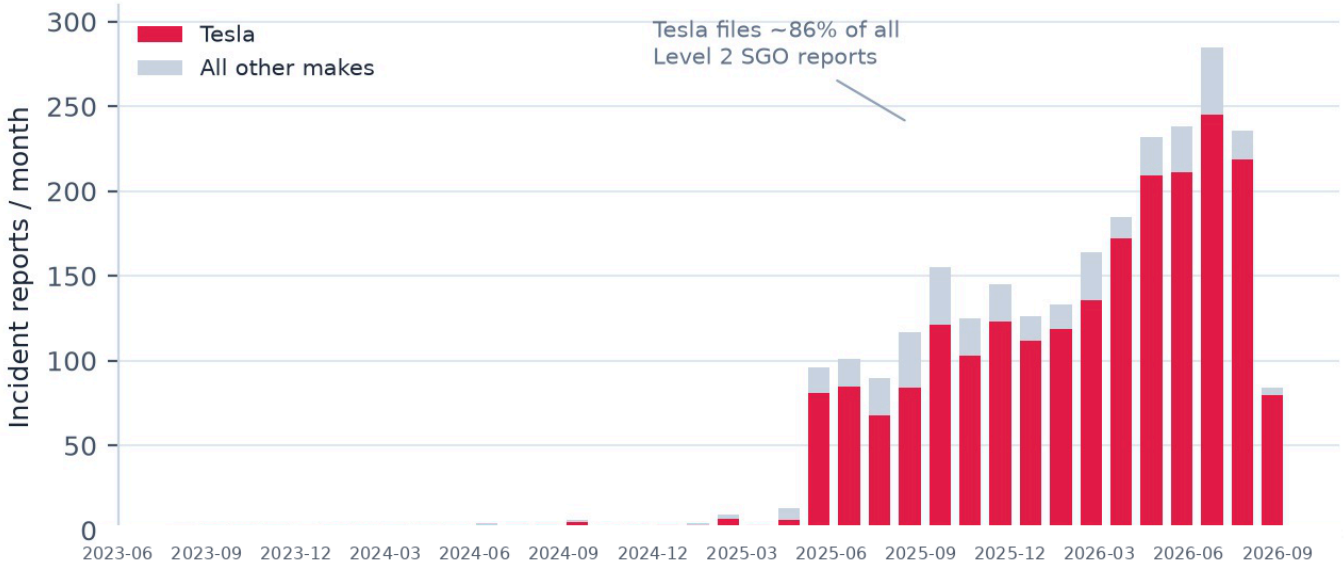
**2,211 vs 57**

TESLA'S LEVEL 2 FILINGS AGAINST ITS DRIVERLESS FILINGS.

CHAPTER FOUR · TWO STREAMS

# The same company, two filing streams, 39× apart

Tesla files Level 2 reports at industrial volume and driverless reports at trickle volume. Both facts are real. Only one of them is a story about safety.




Source: NHTSA SGO ADAS L2 current release, incident months Jun 2025 – Sep 2026; n = 2,574 reports.

### THE DRIVERLESS STREAM

Tesla's ADS filings begin in **July 2025** and run to August 2026: **57 reports covering 36 distinct incidents**, every one of them property damage only. Forty-seven are in Austin, seven in Dallas, two in Houston, one in Tampa. Fifty-six involve a Model Y; one involves a Cybercab.

That is a plausible signature for a young driverless service — and it is not a rate. Tesla does not publish unsupervised miles by quarter, only a cumulative total.

### THE SUPERVISED STREAM

Over the same period Tesla filed **2,211 Level 2 reports** across 49 states, peaking at 245 in July 2026. That is a fleet of millions of vehicles driving on supervised automation every day.

The two streams are not in tension. A large supervised fleet and a small driverless fleet can coexist. What cannot be derived from them is any statement about which is safer per mile.

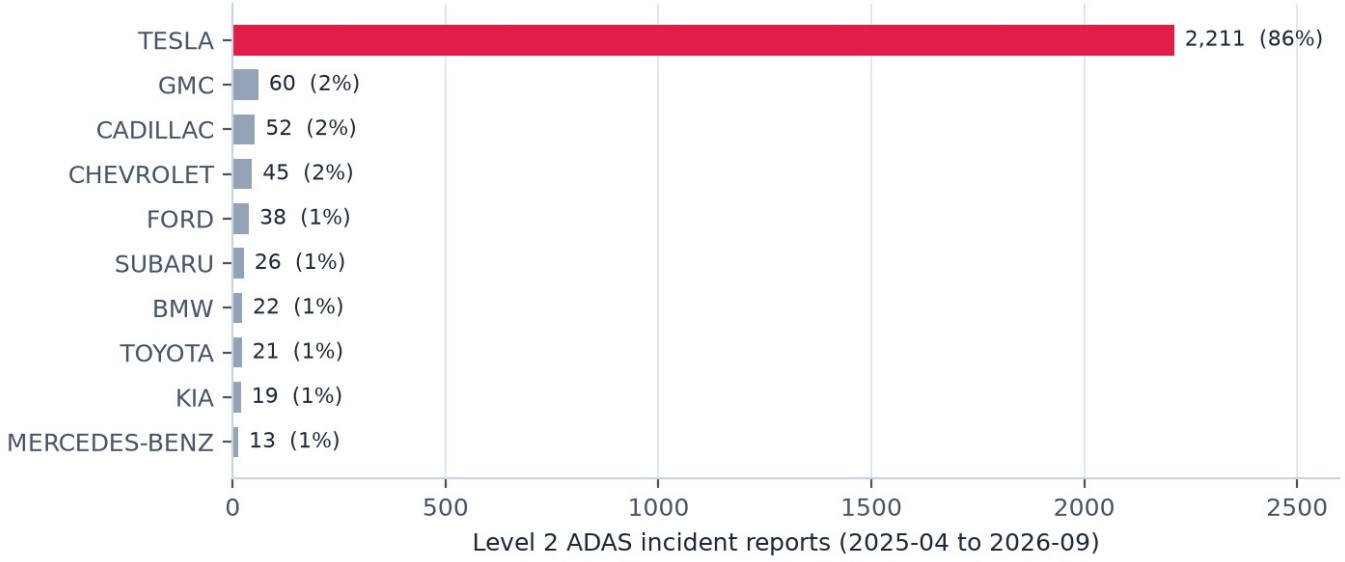



Source: NHTSA SGO current release, ADS and ADAS L2 files. Same company, same period, two reporting streams.

CHAPTER FOUR · THE LEVEL 2 FILE

# Tesla files 86% of all Level 2 reports

Twenty-seven makes report Level 2 crashes. One of them accounts for five in six. The distribution tells you about detection capability as much as crash risk.




Source: NHTSA SGO ADAS L2 current release; n = 2,574 reports across 27 makes.

| MAKE | REPORTS | INCIDENTS | SHARE | UNKNOWN SEVERITY | FATALITIES | SERIOUS |
|---|---|---|---|---|---|---|
| TESLA | 2,211 | 2,166 | 86% | 2,113 | 28 | 12 |
| GMC | 60 | 41 | 2% | 42 | 0 | 1 |
| CADILLAC | 52 | 40 | 2% | 37 | 1 | 0 |
| CHEVROLET | 45 | 35 | 2% | 25 | 2 | 0 |
| FORD | 38 | 28 | 1% | 14 | 0 | 8 |
| SUBARU | 26 | 18 | 1% | 0 | 2 | 0 |
| BMW | 22 | 11 | 1% | 7 | 0 | 2 |
| TOYOTA | 21 | 15 | 1% | 3 | 1 | 8 |
| KIA | 19 | 12 | 1% | 0 | 0 | 0 |
| MERCEDES-BENZ | 13 | 8 | 1% | 0 | 0 | 0 |
| HYUNDAI | 12 | 9 | 0% | 6 | 0 | 0 |
| HONDA | 10 | 7 | 0% | 0 | 1 | 4 |

Source: as above. 'Unknown severity' counts reports coded Unknown for highest injury severity alleged.

**READ THE "UNKNOWN SEVERITY" COLUMN, NOT THE COUNT**

Tesla reports 2,113 of 2,211 Level 2 reports with an unknown injury severity. Toyota (3 of 21), Kia (0 of 19), Subaru (0 of 26) and Mercedes (0 of 13) report almost none. A manufacturer that cannot observe the aftermath files a different kind of record.

CHAPTER FOUR · TESLA'S OWN METHOD

# A published rate that still resists independent audit

Tesla's Vehicle Safety Report publishes per-mile collision rates, but its definitions and underlying data limit independent verification.

## HOW TESLA MEASURES

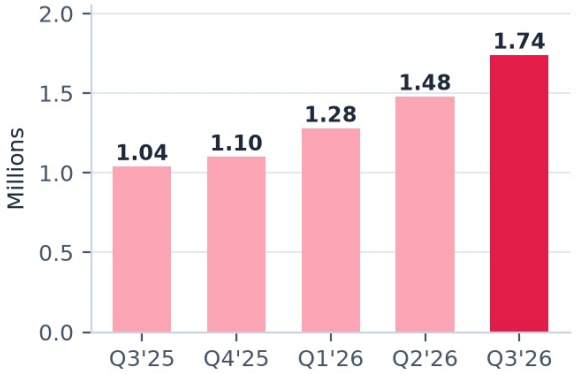
| | |
|---|---|
| **Collision** | 49 CFR §563.5: a non-reversible restraint deployed, or ΔV ≥ 8 km/h within 150 ms |
| **Engaged** | FSD active at any point in the **5 seconds** before impact |
| **Fault** | Not attributed — all collisions counted regardless of cause |
| **Baseline** | FHWA vehicle miles ÷ CISS vehicles-involved collisions |
| **Scale** | 2.5bn telemetry packages in Q3 2025 alone |

### THE 5-SECOND WINDOW

Counting a collision as "FSD-engaged" if the system was active at any point in the five seconds before impact means a driver who disengaged two seconds before a crash still lands in the FSD column. Tesla's stated rationale is that this captures the handover problem. It also makes the FSD and manual buckets less distinct than they appear.



Photo: Dllu / Wikimedia Commons (CC BY-SA 4.0)




Source: Tesla Q3 2026 Update, p.5. Metric counts upfront payment plus monthly subscriptions and excludes free trials, per the 2025 CEO Performance Award definition.

## THE METHODOLOGY CRITIQUE

Goodall (2024) examined Tesla's January 2023 revision of its own past safety reports. Quarter-by-quarter, Autopilot crash rates moved by between **−10.8% and +12.7%**, an average of **−3.6%**. In eight of eleven quarters the revised rate was higher than either pre-revision rate. The revised "not using Autopilot" category is ambiguous, and the series is not comparable over time.

### THE STRUCTURAL PROBLEM

Tesla publishes its own FSD-versus-manual collision rates, but not the raw event data needed for independent replication. Its five-second engagement window and collision definitions also limit direct comparison with Waymo's SGO-based rates.

CHAPTER FOUR · THE REGULATORY LEDGER

# Five actions, five different questions

None of these proceedings is a verdict on whether FSD is safe. Together they describe a system under sustained examination on marketing, monitoring, behaviour and crash reporting at the same time.

| ACTION | DATE | WHAT IT CONCERNS | SCALE |
|---|---|---|---|
| NHTSA PE25012 | Opened 7 Oct 2025 | Preliminary evaluation of FSD traffic-law violations | 2.88M vehicles; 58 incidents, 14 crashes, 23 injuries, 0 fatalities |
| California DMV | 16 Dec 2025 | Autopilot / FSD marketing found misleading | 30-day suspensions avoided after Tesla stopped using Autopilot in CA marketing |
| AMCI Testing | Sep 2024 | Independent real-world FSD evaluation | 75 interventions in 1,000 miles — one every 13 miles |
| IIHS safeguard ratings | Mar 2024 | Partial-automation safeguards, 14 systems | 1 acceptable, 2 marginal, 11 poor |
| NHTSA recall 25V-002 | 2025 | Car-computer board fault can disable rearview camera | Recall filed under Part 573 |

Sources: NHTSA ODI PE25012 Opening Resume (7 Oct 2025); CA DMV (16 Dec 2025; 17 Feb 2026); AMCI Testing release No. 2 (Sep 2024); IIHS news release (Mar 2024); NHTSA Recall 25V-002 Part 573.

## WHAT PE25012 ACTUALLY FOUND

The investigation's population is **2,882,566 vehicles**. Its pre-investigative review identified **58 incidents**: 44 from ODI complaints and 14 from other sources, producing **14 crashes**, **10 injury incidents** and **23 injuries**. No fatalities.

Two behaviour patterns dominate: proceeding through a red signal (18 complaints, 1 media report and 6 SGO reports, four with injuries) and lane violations including crossing into opposing traffic (2 SGO reports, 18 complaints, 2 media reports).

## WHY A MARKETING CASE MATTERS TO A SAFETY REPORT

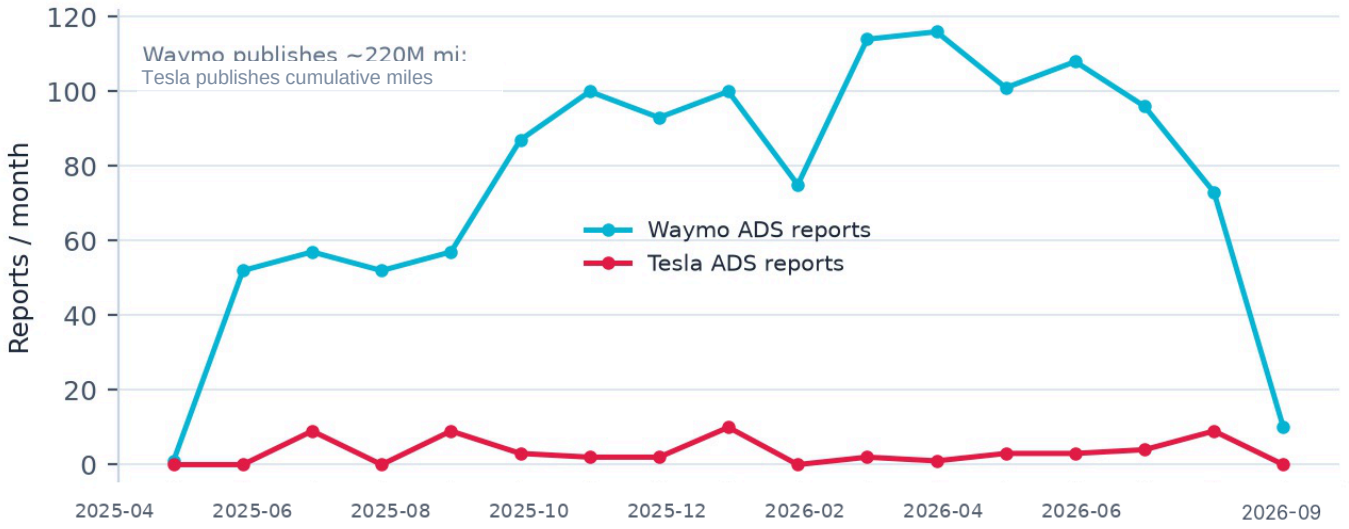
The California action is about words, not crashes. But the words are what set the human's expectation of the system — and in a Level 2 vehicle the human is the safety mechanism of last resort.

> **"Vehicles equipped with those ADAS features could not at the time of those advertisements, and cannot now, operate as autonomous vehicles."**
>
> CALIFORNIA DMV, 16 DECEMBER 2025

CHAPTER FIVE · THE COMPARISON PROBLEM

# A count is not a rate, and 2026 has too many counts

The single most important chart in this report contains no crash data at all. It contains filing counts — and that is precisely the problem.




Source: NHTSA SGO 2021-01 ADS current release. Reports per incident month, by reporting entity.

## WHAT YOU CAN CONCLUDE

Waymo files between 50 and 116 driverless reports a month. Tesla files between zero and ten. Waymo operates in more than a dozen metros and publishes more than 220 miles; Tesla operates a young service in a handful of Texas and Florida markets and publishes a cumulative total.

The counts alone cannot distinguish fleet size from reporting access. That is all.

## WHAT YOU CANNOT CONCLUDE

That Waymo's cars are safer per mile *on the basis of this chart*. The per-mile claim is true — but it comes from Swiss Re, IIHS and Waymo's own analysis, not from the SGO file.

The SGO file does not provide a period-matched Robotaxi mileage denominator, so a comparable per-mile rate cannot be calculated.

## WHAT EACH OPERATOR PUBLISHES

| OPERATOR | CRASH DATA | EXPOSURE DATA | CAN A RATE BE COMPUTED? |
|---|---|---|---|
| **Waymo** | SGO filings; company analysis | Autonomous miles, by period and metro | Yes — multiple published studies estimate rates |
| **Tesla Robotaxi** | SGO filings | Cumulative unsupervised miles only | Not for any single period |
| **Tesla FSD (Supervised)** | SGO filings; fleet telemetry | FSD/manual rates published; raw event data not public | Yes — company-reported; not independently reproducible |
| **Zoox, Avride, May Mobility, others** | SGO filings | None published | No |

CHAPTER FIVE · LIMITS

# What these numbers cannot say

Eight limitations, stated plainly. A report that did not print this page would be selling something.

1. **No SGO denominator:** SGO filings report crashes, not mileage, so no rate. Waymo alone publishes period-specific ADS miles matched to SGO reports.
2. **Severity is alleged, not adjudicated.** "Highest injury severity alleged" is the reporting entity's characterisation at filing time, not a clinical or legal finding.
3. **Detection differs by manufacturer.** Tesla's connected fleet notices events a less-connected manufacturer never learns about. Higher counts can reflect better observation.
4. **Redaction hides the interesting cases.** Narratives, automation versions and ODD status are frequently withheld as confidential business information.
5. **The threshold moved in June 2025.** The third amended order re-based reporting. Long-run trend lines in this report are spliced across that break and should be read with it in mind.
6. **Human under-reporting distorts every benchmark.** Roughly half of all crashes and a third of injury crashes never reach police. Tesla cites NHTSA estimates of 60% of property-damage-only and 32% of injury crashes unreported.
7. **Company benchmarks are modelled.** Waymo's human comparison is a synthetic population for the same roads and period, not a matched control group.
8. **Small numbers stay small.** Two fatalities and four serious-injury reports cannot support a fatality rate for any operator, in either direction.

> **THE HONEST SUMMARY**
>
> Waymo's studied fleets had lower per-mile rates for the outcomes examined than human drivers. The data cannot rank other operators or independently verify Tesla's company-reported FSD rate.

## WHAT WOULD CHANGE THIS CONCLUSION

| IF THIS BECAME AVAILABLE | THEN THIS WOULD BECOME ANSWERABLE |
|---|---|
| **Mandatory mileage reporting** | Whether Tesla's driverless service is as safe per mile as Waymo's — the single largest open question in the file |
| **Independent FSD data** | Whether Tesla's published FSD-versus-manual rates can be independently reproduced and compared with external benchmarks. |
| **Adjudicated injury outcomes** | Whether the "Unknown" severity gap reflects crash reality or reporting practice |

CHAPTER SIX · THE MARKET

# Capital and insurers are already pricing the gap

Markets do not wait for a federal dataset. Insurance pricing, fleet economics and consumer trust are all moving on the assumption that the safety case is directionally settled.

**$7bn**

**Annual robotaxi rideshare revenue by 2030**

From ~$300M in 2025 — ~90% CAGR

**~50%**

**Per-mile discount for FSD-engaged driving**

Lemonade, from 26 Jan 2026

**13%**

**US drivers who would trust a self-driving car**

Up from 9% a year earlier

## THE INSURANCE MARKET HAS ALREADY MOVED

Lemonade's January 2026 product prices FSD-engaged miles at roughly half the rate of human-driven miles, built on a data-sharing arrangement with Tesla. That is a market verdict on relative risk that no federal dataset yet supports — and it is being made with data the public cannot inspect.

Goldman Sachs' June 2025 report estimated North American rideshare bookings at ~$58bn, with the broader total addressable market (TAM) rising from $252bn in 2025 to more than $336bn by 2030. It forecast robotaxi-filled rideshare revenue of ~$300M in 2025 and ~$7bn in 2030 (about 8% of the TAM). Its ~$3.5bn gross-profit estimate applies to the total US AV market.

## THE TRUST GAP IS THE BINDING CONSTRAINT

AAA's February 2025 survey found 13% of US drivers would trust riding in a self-driving vehicle — up from 9% — while six in ten remain afraid. Seventy-four per cent had heard of robotaxis; 53% said they would not choose one.

J.D. Power found only 38% of consumers could accurately define a fully automated vehicle. The naming problem is measurable, and it is not solved by a better crash statistic.



Photo: 9yz / Wikimedia Commons (CC BY 4.0)

The pictured vehicle is Zoox's purpose-built robotaxi, designed for fully driverless passenger service rather than a conventional human-operated vehicle.

APPENDIX A

# Driverless (ADS) incident reports

NHTSA SGO 2021-01, ADS file, current release. Incident dates April 2025 – September 2026; reports received through 15 September 2026.

| REPORTING ENTITY | REPORTS | INCID. | SHARE | INJURY | S/F | FIRST | LAST |
|---|---|---|---|---|---|---|---|
| Waymo LLC | 1,292 | 1,283 | 81.0% | 132 | 6 | 2025-04 | 2026-09 |
| Avride Inc. | 91 | 83 | 5.7% | 5 | 0 | 2025-06 | 2026-08 |
| Zoox, Inc. | 79 | 78 | 5.0% | 11 | 0 | 2025-06 | 2026-09 |
| Tesla, Inc. | 57 | 36 | 3.6% | 5 | 0 | 2025-07 | 2026-08 |
| May Mobility | 21 | 20 | 1.3% | 4 | 0 | 2025-07 | 2026-08 |
| Motional | 15 | 15 | 0.9% | 2 | 0 | 2025-06 | 2026-09 |
| Aurora Operations, Inc. | 8 | 8 | 0.5% | 1 | 0 | 2025-08 | 2026-08 |
| Nuro | 7 | 7 | 0.4% | 0 | 0 | 2025-06 | 2026-07 |
| Other (11 entities) | 25 | 23 | 1.6% | 2 | 0 | | |
| **Total** | **1,595** | **1,553** | **100%** | **162** | **6** | | |

| MONTH | WAYMO | TESLA | ZOOX | AVRIDE | MAY | OTHER | TOTAL |
|---|---|---|---|---|---|---|---|
| 2025-06 | 52 | 0 | 2 | 1 | 0 | 6 | 61 |
| 2025-07 | 57 | 9 | 4 | 0 | 2 | 1 | 73 |
| 2025-08 | 52 | 0 | 4 | 0 | 3 | 4 | 63 |
| 2025-09 | 57 | 9 | 3 | 1 | 0 | 3 | 73 |
| 2025-10 | 87 | 3 | 7 | 1 | 0 | 3 | 101 |
| 2025-11 | 100 | 2 | 2 | 4 | 3 | 2 | 113 |
| 2025-12 | 93 | 2 | 2 | 16 | 3 | 0 | 116 |
| 2026-01 | 100 | 10 | 3 | 6 | 1 | 3 | 123 |
| 2026-02 | 75 | 0 | 6 | 10 | 0 | 3 | 94 |
| 2026-03 | 114 | 2 | 12 | 14 | 1 | 2 | 145 |
| 2026-04 | 116 | 1 | 6 | 13 | 2 | 8 | 146 |
| 2026-05 | 101 | 3 | 4 | 7 | 2 | 1 | 118 |
| 2026-06 | 108 | 3 | 9 | 9 | 0 | 2 | 131 |
| 2026-07 | 96 | 4 | 6 | 7 | 2 | 6 | 121 |
| 2026-08 | 73 | 9 | 8 | 2 | 2 | 10 | 104 |
| 2026-09 | 10 | 0 | 1 | 0 | 0 | 1 | 12 |
| **Total** | **1,291** | **57** | **79** | **91** | **21** | **55** | **1,594** |

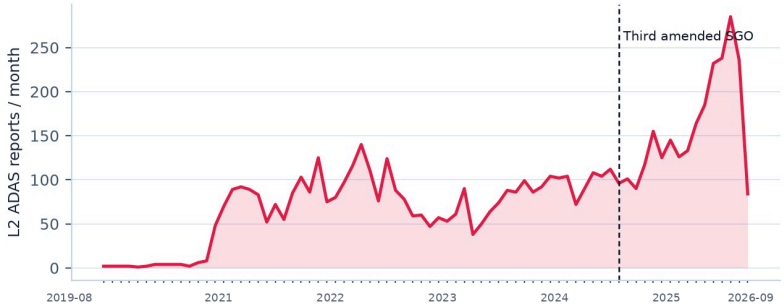
Source: NHTSA SGO 2021-01 ADS current release. S/F = Serious W/ Hospitalization plus Fatality. Sep 2026 partial. Incident counts sum to 1,553 because one incident was filed by two entities; 1,552 distinct incidents.

APPENDIX B

# Level 2 ADAS incident reports

NHTSA SGO 2021-01, ADAS L2 file, current release. 2,574 reports across 27 makes; incident dates January 2023 – September 2026, concentrated from June 2025.

| MONTH | TESLA | GMC | FORD | SUBARU | BMW | OTHER | TOTAL |
|---|---|---|---|---|---|---|---|
| 2025-09 | 84 | 6 | 0 | 4 | 0 | 23 | 117 |
| 2025-10 | 121 | 7 | 2 | 5 | 8 | 12 | 155 |
| 2025-11 | 103 | 5 | 1 | 1 | 4 | 11 | 125 |
| 2025-12 | 123 | 4 | 2 | 0 | 0 | 16 | 145 |
| 2026-01 | 112 | 3 | 0 | 0 | 0 | 11 | 126 |
| 2026-02 | 119 | 2 | 4 | 1 | 1 | 6 | 133 |
| 2026-03 | 136 | 2 | 7 | 0 | 1 | 18 | 164 |
| 2026-04 | 172 | 1 | 1 | 0 | 2 | 9 | 185 |
| 2026-05 | 209 | 4 | 2 | 2 | 1 | 14 | 232 |
| 2026-06 | 211 | 5 | 2 | 0 | 2 | 18 | 238 |
| 2026-07 | 245 | 7 | 8 | 1 | 3 | 21 | 285 |
| 2026-08 | 219 | 4 | 2 | 2 | 0 | 9 | 236 |
| 2026-09 | 80 | 1 | 2 | 0 | 0 | 1 | 84 |
| **Total, 13 months** | **1,934** | **51** | **33** | **16** | **22** | **169** | **2,225** |




Source: NHTSA SGO ADAS L2 archive (Aug 2019 – Jun 2025) spliced to the current release (Jun 2025 – Sep 2026); n = 6,289 reports.

| TESLA MODEL | REPORTS | SHARE |
|---|---|---|
| Model Y | 1,063 | 48.1% |
| Model 3 | 821 | 37.1% |
| Model X | 142 | 6.4% |
| Model S | 114 | 5.2% |
| Cybertruck | 69 | 3.1% |
| Cybercab | 2 | 0.1% |

Source: NHTSA SGO 2021-01 ADAS L2 current release. September 2026 is partial.

APPENDIX C

# Method and sources

How the numbers in this report were produced, where they come from, and what the words mean. The Waymo benchmark table itself is on page 12.

## METHOD NOTES

**De-duplication.** Reports are counted as filed. Distinct incidents use *Same Incident ID*, keeping the highest *Report Version*. The ADS file contains 1,595 rows but 1,552 distinct incidents; the L2 file 2,574 rows and 2,424 incidents.

**Long-run series.** The archive files run to June 2025; the current files begin in mid-2025. Series are spliced at June 2025, the first month of the third amended order. The break is marked on every chart.

**Severity.** "Any injury" = Minor, Moderate or Serious, with or without hospitalisation. "Serious / fatal" = Serious W/ Hospitalization plus Fatality. All severity is as alleged at filing.

**Rounding.** Percentages are computed on unrounded counts and may not sum to 100.

## SOURCES

NHTSA SGO 2021-01 ADS and ADAS L2 incident reports, current release (through 15 Sep 2026) and 2021–2025 archives · SGO 2021-01 Data Element Definitions (15 Oct 2026) · Waymo safety data blog (24 Jun 2026) · IIHS, *Waymo's driverless cars crash less often than people* (23 Jul 2026) · Swiss Re / Waymo, *Comparison at 25 million miles* (Nov 2024) · Tesla Q3 2026 Update, 8-K Ex. 99.1 (21 Oct 2026) · Tesla Q4 FY2025 Update (Jan 2026) · Tesla Q3 2025 earnings call (22 Oct 2025) · Tesla FSD (Supervised) Vehicle Safety Report (7 Feb 2026) · Goodall, *A note on Tesla's revised safety report crash rates* (2024) · NHTSA ODI PE25012 Opening Resume (7 Oct 2025) · California DMV decision (16 Dec 2025) · AMCI Testing release No. 2 (Sep 2024) · IIHS partial-automation safeguard ratings (Mar 2024) · Goldman Sachs, United States: AVs (9 Jun 2025) · Lemonade autonomous car insurance (21 Jan 2026) · AAA, *Fear in Self-Driving Vehicles Persists* (25 Feb 2025) · J.D. Power, *US Mobility Confidence Index* (2023) · CRS R48605 (Jul 2025) · SAE J3016 (2018) · Mercedes-Benz DRIVE PILOT press release (21 Jun 2024)

## GLOSSARY

| TERM | MEANING IN THIS REPORT |
|---|---|
| **SGO 2021-01** | NHTSA order requiring crash reports for ADS and specified Level 2 ADAS incidents. |
| **ADS** | Automated driving system — SAE Level 3–5. The "driverless" category in this report |
| **ADAS (L2)** | Level 2 advanced driver assistance — the human remains responsible for the drive |
| **ODD** | Operational design domain: the conditions under which a system is designed to work |
| **ΔV** | Change in velocity during impact; Tesla uses ΔV ≥ 8 km/h within 150 ms for non-deployment collisions. |
| **VMT** | Vehicle miles travelled — the denominator required for any crash rate |