WAYMO

Senate Committee on Commerce, Science, and Transportation
Hearing on "Hit the Road, Mac: The Future of Self-Driving Cars"
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Written Testimony
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Chairman Cruz, Ranking Member Cantwell, and Members of the Committee:

Thank you for the opportunity to testify on the state of the autonomous vehicle (AV) industry and the critical role of federal leadership in ensuring a safer, more accessible, and more competitive future for American transportation. My name is Mauricio Peña, and I serve as the Chief Safety Officer at Waymo.

I. An American Innovation Success Story

Waymo's mission is to be the world's most trusted driver. Launched in 2009 as a Google moonshot, we were motivated by the belief that autonomous driving technology could improve road safety and eliminate road crashes due to human errors, such as impairment, distraction, and speeding, that contribute to the vast majority of the annual preventable roadway deaths in the United States and around the world.

Today, Waymo is no longer a research project with theoretical benefits. We are a 24/7 scaled commercial reality, carrying riders safely to their destinations with no one behind the wheel. We are already making roads safer in the cities where we operate. Waymo is the first and only company in the world providing fully autonomous, Level 4 trips to the public at scale, with service currently spanning six major U.S. metro areas: Phoenix, San Francisco Bay Area, Los Angeles, Austin, Atlanta, and Miami, with many more to come.

The maturity of our technology – the Waymo Driver – is reflected in our scale, having now completed nearly 200 million fully autonomous miles on public roads. This milestone was achieved entirely without a human behind the wheel. We provide more than 400,000 rides every week, and at the conclusion of 2025, our lifetime total exceeded 20 million trips. These are not just rides; they are essential connections for the people we serve: patients heading to medical appointments, travelers going to the airport, parents picking up their children from soccer practice, and even families bringing newborns home from the hospital. We are there for our

riders through their every day moments, both big and small, and are proud to be getting them safely where they need to go.

As Waymo safely scales, we are growing a broad AV industry ecosystem with new businesses that hire workers to support fleets of AVs, including manufacturers that integrate Waymo's technology into base vehicles, mechanics and vehicle technicians who maintain AV fleets, and dispatchers and facilities managers who help run our operations. Our fully autonomous technology is designed and manufactured in Silicon Valley. The vehicles themselves are outfitted with our American-designed hardware and software at our facility in Mesa, Arizona, an investment that has created hundreds of local jobs. In every city we expand to, we create a broad spectrum of new roles, including many that do not require a university degree. We are already on the ground in more than twenty U.S. cities, and together with our partners, we are delivering new career opportunities that support our safe and convenient ride-hailing service.

We recognize that careers in the transportation industry will shift, even as new job opportunities emerge. Some studies suggest that 190 jobs will be required for the manufacture and servicing of every 1,000 vehicles. These include 95 in development and production; 30 in distribution; and 65 in maintenance, upgrades and repairs. We are investing in non-traditional pathways to careers in this industry, to ensure the opportunities are available to Americans of all backgrounds. This includes financial support for educational and skills programs in technical schools, as well as helping fund scholarships for students and working technicians attending programs outside of the traditional four-year college setting.

II. A Proven Safety Record Rooted in Data and Transparency

We are making these investments in America to tackle one of our most pernicious public health problems: the persistent road safety crisis that needlessly claims 40,000 lives annually in this country and more than one million people across the globe. At Waymo, we believe it does not have to be this way.

Our mission is to build the world's most trusted driver – a goal that begins with a safety culture established at the highest levels of our leadership. We work every day to earn trust with our riders, policymakers, regulators, and partners through our transparent and exceptional safety record. This is the result of years dedicated to refining a comprehensive set of methodologies to assess safety across our technology and operations and ultimately to guide the deployment and safe operations of the Waymo Driver.

Through our operations in major U.S. cities, we are able to observe the proven, positive impact our technology is having on road safety, and we believe we have a moral imperative to pair our technology with ongoing investments in making America's roads safer for everyone.

We conduct extensive safety comparisons between human and automated driving utilizing peer-reviewed methodology and retrospective analyses, which we then report to the federal government. We have found the Waymo Driver has been involved in 10x fewer serious injury or worse crashes, 12x fewer injury-causing crashes involving a pedestrian, 5x fewer crashes with airbag deployment, and 5x fewer injury-causing crashes compared to human drivers covering the same mileage in the cities we serve, on the same road types, and in the same conditions we operate in.

Our reviews allow us to better understand the safety impact we have in the communities in which we operate, such as better protecting pedestrians and cyclists, or nearly eliminating collisions that occur in intersections. Using this methodology, Waymo regularly publishes extensive safety data that demonstrates that the Waymo Driver is meaningfully improving road safety and reducing related damage and injuries in the cities where we operate.

We are also working closely with external partners to learn from the safety performance of our technology. For example, we partnered with global reinsurance company Swiss Re to analyze our first 25 million fully autonomous miles, determining the Waymo Driver demonstrated better safety performance compared to human-driven vehicles (including those with ADAS features). Based on this analysis, we estimate that the Waymo Driver reduced property damage claims by 88% and bodily injury claims by 92%.

III. Determining Readiness Prior to Deployment

Prior to the deployment of driverless operations in a specific location, Waymo implements rigorous evaluation methods – referred to in the aggregate as our Safety Framework – to determine readiness of the Waymo Driver to engage in autonomous driving. We use this holistic approach to evaluate if the Waymo Driver is ready for deployment in a particular automated driving system (ADS) configuration, for a specific Operational Design Domain, and a given mileage scale. There is no single metric or methodology that captures the entire safety performance. Instead, it takes a suite of complementary methodologies – including simulation, real-world driving, and closed-course testing – to analyze and paint a comprehensive picture of the overall safety of the system. We use 12 methodologies that evaluate the autonomous system against a set of internal acceptance criteria. Some of these methodologies are widely-used, traditional safety activities such as Systems Safety, Verification and Validation, and Risk Management, and others are methodologies that Waymo has developed specifically for autonomous driving.

Waymo's safety case serves an important safety assurance function by pressure testing the assumptions in our various safety methodologies as well as the credibility of the arguments and

the evidence supporting those arguments. A safety case is defined as "a structured argument, supported by a body of evidence that provides a compelling, comprehensible and valid case that a system is, or will be, adequately safe for a given application in a given environment." Use of safety cases as a basis for certification of complex safety-critical systems is common in several safety critical industries, including aerospace, nuclear, defense, oil and gas, and rail, and safety case methodology is used in many countries including the U.S. It ensures we can have a high degree of confidence that through application of our rigorous safety methodologies we have sufficiently mitigated unreasonable risks posed by the Waymo Driver prior to deployment.

Our safety record is also the result of rigorous internal oversight. We have a robust governance structure with three layers of accountability that culminates in the approval to deploy our vehicles. First, the leads of each of our twelve safety framework methodologies evaluate the system against a set of acceptance criteria within their domains and summarize their findings into a report that is provided to the second layer, our Safety Framework Steering Committee. This cross-functional group of senior leaders aggregate the evaluation results across methodologies and make a recommendation about our deployment to the third layer, the Waymo Safety Board. This Board is composed of the Chief Safety Officer, the Chief Product Officer, and one of our co-CEOs. Together, the body makes the ultimate decision for deployment approval. Without review through this rigorous governance process, we issue no software updates, make no determinations to increase our mileage or fleet scale, and make no updates to the scope of our service territories, among other key decisions.

Recently, Waymo's safety case approach has been independently audited by TÜV SÜD, a global leader in safety testing and certification. Their audit confirmed that Waymo's safety case program adheres to AVSC Best Practices and to the ISO 15026 industry standards, representing the state of the art for safety case assessment and management. Waymo views such independent audits as a fundamental component of our overall safety strategy.

IV. Expanding Mobility Options and the Benefits of AVs

Autonomous vehicles technology, like that offered by Waymo, represent a life-changing advancement for those who currently face significant transportation barriers, including seniors and people with disabilities who cannot obtain a driver's license. For blind and low-vision riders, Waymo provides a reliable, consistent, and independent mobility experience. Because Waymo owns and operates its fleet, we are uniquely positioned to integrate purpose-built accessibility features directly into our product. We believe the benefits of AV technology will reach the broadest number of riders most quickly through shared ride-hailing services like ours. To that end, we have made it a priority to develop inclusive features in partnership with the disability community, such as screen reader support for navigating our app, audio cues for the in-car experience, and custom "car honks" to help riders locate their vehicle at pickup.

V. Strategic Imperative: Winning the Global AV Race

Waymo is a proud American success story, but we are at a critical crossroads. The leadership our country established in the autonomous vehicle sector is now under direct threat. The United States is locked in a global race with Chinese AV companies for the future of autonomous driving, a trillion-dollar industry comparable in strategic importance to flight and space travel. Chinese competitors are scaling rapidly with heavy state support, and – second to Waymo – the largest AV fleets in the world are operated by Chinese AV companies.

The leading Chinese AV startups have tested on U.S. roads already, and are now taking those learnings and using them to bring their technology to other countries across the globe. We have seen reports that Chinese AV companies are moving quickly into international capitals in Europe, the Middle East, and Asia; in some cases, they are partnering with U.S. companies to accelerate their desired dominance. We cannot fall behind when it comes to this American-made technology.

In the absence of U.S. leadership on a national AV legislative framework, Chinese AV competitors will fill the gap and set the safety and technical standards for the rest of the world. The global race will ultimately come down to whether Chinese or American AV companies will drive the rest of the world, and Waymo wants America's innovators to win that race. We support federal efforts, such as the Department of Commerce's Connected Vehicle rule, to protect our critical infrastructure and ban Chinese AV software in the U.S. starting this year.

VI. A Durable National AV Legislative Framework

We believe Congress has a once-in-a-generation opportunity to secure American leadership in this industry by creating a national AV legislative framework that sets a high safety standard for this industry. Greater certainty will unlock even more investment and prevent bad actors from undermining public trust in this novel, life-changing technology. We share the Committee's goal of ensuring a national AV framework is included in the Surface Transportation Reauthorization bill. This is the vehicle to ensure that the U.S. remains in the driver's seat of innovation.

Our key legislative priorities for national AV framework include:

- **Establishing a national safety baseline:** Require manufacturers to document a robust "safety case" for their automated driving systems, providing evidence of safe performance of important driving competencies within the system's operational design domain.

- **National Safety Data Repository:** Establish a centralized repository for safety data, such as crashes and vehicle miles traveled, to provide easier access to crash information to state regulators and the public. This would not only standardize the current state-by-state patchwork of reporting but would also ensure consistent, industry-wide transparency and accountability in data reporting.

- **Modernizing FMVSS:** Update the Federal Motor Vehicle Safety Standards (FMVSS) to remove requirements for manual controls (e.g., steering wheels and pedals) in vehicles specifically designed for autonomous use.

- **AV Accessibility Act:** Ensure the mobility benefits of AVs are fully accessible to people with disabilities.

To win the global AV race, the U.S. needs more than just innovation – we need a predictable, durable national regulatory framework that sets a high safety standard. Without it, we face a fragmented landscape of state regulations that creates uncertainty, slows investment, and creates unequal access to the technology. To truly deliver on the promise of fully autonomous vehicles, we need federal leadership and we need it in this Congress.

Waymo has built a technology that is already achieving remarkable road safety outcomes. We look forward to working with the Committee to ensure that American safety and American innovation are the gold standard for autonomous driving tech standards around the world.

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