Kansas State Legislature
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Topeka, KS 66612

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Testimony before the Senate Transportation Committee - Kansas Legislature

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Mr. Chairman and members of the Committee,

Thank you for the opportunity to appear today in support of SB 379 and share with you our vision for the safe and structured introduction of autonomous vehicles in the state of Kansas. Gatik is the leader in autonomous middle mile logistics, delivering goods safely and efficiently using its fleet of light and medium duty trucks on behalf of Walmart, and other major retail partners. Founded in 2017 by veterans of the autonomous technology industry, the company's headquarters are in Mountain View, California. In 2021, Gatik was recognized on the Forbes AI 50 list and as a World Economic Forum Technology Pioneer, and partners with industry leaders including Ryder, Goodyear and Isuzu. Gatik exclusively operates a fleet of class 3-6 vehicles, that weigh no more than 26,000lbs, across multiple markets including Texas, Arkansas, Louisiana and Ontario, Canada.

Since commencing commercial operations, Gatik has achieved a 100 percent safety record across each operational site, and in August 2021, launched the world's first fully driverless commercial delivery service for Walmart in Bentonville, Arkansas. Gatik has achieved its exemplary safety record and fully driverless milestone by operating exclusively on the middle mile, defined as the intra-state commercial movement of goods, in a business-to-business capacity, between two or more fixed points on fixed, repeatable routes. This constrained and measured approach to autonomous delivery offers significant benefits including: improving safety by reducing the number of road incidents caused by distracted, inattentive or impaired driving; establishing reliability across the supply chain's middle mile by protecting against driver shortages, securing dedicated capacity and increasing product flow; reducing emissions and meeting sustainability goals by improving fuel economics and reducing service and maintenance requirements.
At Gatik, our meticulous approach to fail safe operations is the reason we're able to boast a 100% safety record across all our operational sites. Our approach towards rolling out the capabilities for fully driverless operations is incremental rather than binary, which enables us to continue adding value for our customers — we are focused on addressing customer pain-points. Gatik's foundational Operational Design Domain (ODD) framework aims to provide a structure

to define the capabilities of the autonomous stack at any given point and connect those capabilities to the routes and operating areas. This enables us to deploy, test & validate targeted releases incrementally, enabling expanding ODDs for fully driverless operations in a predictable manner. Our unique approach enabled us to safely achieve the worldwide-first fully driverless milestone in a commercial capacity with Walmart.

Before any autonomous vehicle (AV) can be deployed for service, it needs to be trained and validated for its ODD. This is one of the major challenges that keep autonomous vehicles from being deployed at scale without a safety driver. For use-cases where such vehicles will be deployed in broader ODDs like “Anywhere, Everywhere” or “Geo-fenced”, the domain becomes unreasonably huge to enable collection of an evenly distributed sample data that is representative of the entire domain using which the system can be designed for (training of machine learning models) or validated against. However, for a fixed route ODD, this domain shrinks exponentially as the priors are derived not only from spatial information, but from temporal axis as well. Given the known route structured use-case, Gatik’s core AV software stack uses a hybrid approach towards autonomy which is a combination of data-driven learning models combined with classical robotics techniques - The learning part allows us to scale their system quickly whereas the classical part ensures safety & reliability.

Gatik uses a strategy of multiple layers of redundancies — Hardware (sensors, compute), Software, Network and Systems level, including a human-in-loop — to ensure the system is able to gracefully fallback to a fail-safe state without creating a safety concern for itself or other road users. This is complemented with our custom tiered diagnostics system inspired by automotive & aviation built-in-self-tests approach that proactively catches hardware, software, or vehicle issues. Any warnings, errors & faults cause the system to switch to an alternate mode or redundant component that still operates. Based on these exhaustive diagnostics onboard, the system can gracefully fallback into one of the many Minimum Risk Conditions (MRC) such as pulling over to the curbside, or slowing down in lane with hazard lights on in case of any uncertainties or failures. Our AV stack & redundancies handle the majority of the driving decisions locally on their own - even after that, if there is a unique situation that falls out of our design ODD – our software stack can identify it and trigger one of the many recovery behaviors built into the system to safely tackle such scenarios including human-in-loop decisions from our Remote Supervisors - for example, Gatik’s Remote Supervisors can re-route the truck in case of lane closures.

We use a proven three-step method for verification and validation of our systems that includes simulation, closed-track testing and real-world testing. We start with verification of requirements through Model in the Loop (MIL), Software in the Loop (SIL), Hardware in the Loop (HIL) and fault injection at every level. MIL provides virtual testing in the absence of hardware. SIL provides target code testing in a simulated environment. HIL provides complete component and subsystem hardware testing.

In closed-course track testing, our highly trained & vetted Safety Drivers stay behind the wheel on a simulated urban course and subject the vehicles to edge cases and difficult situations. This

enables testing the system's ability to transition to a Minimum Risk Condition during malfunctions through deliberate fault injection, such as for braking and sensors, with the Safety Drivers able to retake control at any time. After an exhaustive verification & validation process, our trucks are introduced on public roads for testing with our highly trained Safety Drivers behind the wheel.

Gatik has proudly partnered with Walmart since June 2019, where it began commercial operations in Bentonville, Arkansas. In February 2020, Gatik and Walmart expanded their operations to New Orleans, Louisiana. Gatik's autonomous delivery service provides Walmart with a safe, efficient and sustainable solution for transporting goods on fixed, repeatable routes between their dark stores (locations that stock items for fulfillment but aren't open to the public) and retail locations (where consumers can access the goods they've ordered).

During an era in which the supply chain is under more scrutiny than ever before, Gatik's autonomous solution safely facilitates frequent, point-to-point deliveries across the middle mile. This hub-and-spoke distribution model has become increasingly vital - dramatic eCommerce growth and faster delivery expectations have forced dark stores closer to consumers, necessitating more routes and more frequent trips, which in turn result in the need for more box trucks, more drivers and higher costs. In partnership with Walmart, Gatik's autonomous technology provides the capability to address these challenges in Kansas, and help to establish a supply chain that is safer, more sustainable and more resilient. Gatik's proposed roll-out of autonomous vehicles in Kansas would involve the deployment of class 3-6 vehicles only, operating exclusively on the middle mile, helping to make sure essential goods and supplies are available, with speed and efficiency, to Kansans. Gatik's proposed operations in Kansas are also poised to support economic growth and create new employment opportunities for Kansas. It is expected that Gatik's deployment in the state will create 20-25 new positions within 18 months of commencing operations.

The benefits of Gatik's proposed operations in Kansas will be significant: establishing a safe, reliable solution for the supply chain's middle mile, creating jobs, working with local organizations to connect people to jobs, reducing costs and driving sustainability. Gatik sincerely appreciates the opportunity to share this testimony in support of SB 379 and looks forward to working closely with the state of Kansas to ensure that the safety, economic and societal benefits of autonomous delivery can be realized by Kansas in the near-term.