

**UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
FORM 10-K**

ANNUAL REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the fiscal year ended December 31, 2022
OR

TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from _____ to _____
Commission file number 001-40326

TuSimple Holdings Inc.

(Exact name of registrant as specified in its charter)

Delaware (State or other jurisdiction of incorporation or organization)	86-2341575 (I.R.S. Employer Identification No.)
9191 Towne Centre Drive, Suite 600 San Diego, CA (Address of Principal Executive Offices)	92122 (Zip Code)

Registrant's telephone number, including area code **(619) 916-3144**
Securities registered pursuant to Section 12(b) of the Act:

<u>Title of each class</u>	<u>Trading Symbol(s)</u>	<u>Name of each exchange on which registered</u>
Class A Common Stock, par value \$0.0001 per share	TSP	The Nasdaq Stock Market LLC (Nasdaq Global Select Market)

Securities registered pursuant to section 12(g) of the Act: **None**

Indicate by check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes No

Indicate by check mark if the registrant is not required to file reports pursuant to Section 13 or Section 15(d) of the Act. Yes No

Indicate by check mark whether the registrant: (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports); and (2) has been subject to such filing requirements for the past 90 days. Yes No

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes No

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company, or an emerging growth company. See the definitions of "large accelerated filer," "accelerated filer," "smaller reporting company," and "emerging growth company" in Rule 12b-2 of the Exchange Act.

Large accelerated filer	<input checked="" type="checkbox"/>	Accelerated filer	<input type="checkbox"/>
Non-accelerated filer	<input type="checkbox"/>	Smaller reporting company	<input type="checkbox"/>
		Emerging growth company	<input type="checkbox"/>

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act.

Indicate by check mark whether the registrant has filed a report on and attestation to its management's assessment of the effectiveness of its internal control over financial reporting under Section 404(b) of the Sarbanes-Oxley Act (15 U.S.C.7262(b)) by the registered public accounting firm that prepared or issued its audit report.

If securities are registered pursuant to Section 12(b) of the Act, indicate by check mark whether the financial statements of the registrant included in the filing reflect the correction of an error to previously issued financial statements.

Indicate by check mark whether any of those error corrections are restatements that required a recovery analysis of incentive-based compensation received by any of the registrant's executive officers during the relevant recovery period pursuant to §240.10D-1(b).

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Act). Yes No

The aggregate market value of voting stock held by non-affiliates of the Registrant on June 30, 2022, based on the closing price of \$7.23 for shares of the Registrant's Class A common stock as reported by the Nasdaq Global Select Market, was approximately \$948.7 million. Shares of common stock beneficially owned by each executive officer, director, and holder of more than 10% of our common stock have been excluded in that such persons may be deemed to be affiliates. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of August 31, 2023, the number of shares of the registrant's Class A common stock outstanding was 205,103,184 and the number of shares of the registrant's Class B common stock outstanding was 24,000,000.

DOCUMENTS INCORPORATED BY REFERENCE

None.

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EXPLANATORY NOTE

As previously reported, we were unable to file this Annual Report on Form 10-K for the year ended December 31, 2022, as well as our Quarterly Report on Form 10-Q for the quarters ended on March 31, 2023 and June 30, 2023, with the Securities and Exchange Commission ("SEC") on a timely basis as a result of our prior independent registered public accounting firm's resignation on November 17, 2022. An overview of recent developments is included in this Annual Report on Form 10-K in Part I, Item 1A, under "Our failure to timely file periodic reports with the SEC may result in the delisting of our Class A common stock." Except as otherwise noted, the information in this report speaks as of the period covered thereby.

SPECIAL NOTE REGARDING FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains forward-looking statements within the meaning of the federal securities laws, which statements involve substantial risks and uncertainties. All statements other than statements of historical facts contained in this Annual Report on Form 10-K are forward-looking statements. The words “believe,” “may,” “will,” “estimate,” “continue,” “anticipate,” “design,” “intend,” “expect,” “could,” “plan,” “potential,” “predict,” “seek,” “should,” “would,” or the negative version of these words and similar expressions are intended to identify forward-looking statements. Forward-looking statements contained in this Annual Report on Form 10-K include, but are not limited to, statements about:

- our future performance, including our revenue, cost of revenue, and operating expenses;
- the sufficiency of our cash and cash equivalents to meet our operating requirements;
- our ability to scale our Autonomous Freight Network;
- our ability to attract new users to our products and services;
- our ability to effectively manage our business strategy and future expenses;
- the estimated timing for when additional routes will be available;
- our ability to compete in a market that is rapidly evolving and subject to technological developments;
- our estimated total addressable market, the market for autonomous truck and freight transport solutions, and our market position;
- our ability to successfully collaborate with business partners and the willingness of business partners to work with us;
- our ability to obtain, maintain, protect, and enforce our intellectual property;
- our ability to comply with modified or new laws and regulations applicable to our business or industry;
- our involvement in and ability to resolve on favorable terms, if at all, any regulatory or government actions, inquiries or investigations, or securities litigation;
- our ability to attract and retain employees with the technical skills we require and other key personnel;
- our ability to achieve our driver-out milestones on the timeline expected;
- our anticipated investments in research and development and sales and marketing, and the effect of these investments on our results of operations;
- the increased expenses associated with being a public company; and
- the potential impact of inflation, rising interest rates, wars and other global hostilities on our and our partners’ business and results of operations, and on the global supply chain and economy generally.

We caution you that the foregoing list may not contain all of the forward-looking statements made in this Annual Report on Form 10-K.

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Annual Report on Form 10-K primarily on our current expectations and projections about future events and trends that we believe may affect our business, financial condition, results of operations, and prospects. These forward-looking statements are subject to a number of risks, uncertainties, and assumptions, including those described in the section titled “Risk Factors” and elsewhere in this Annual Report on Form 10-K. Moreover, we operate in a very competitive and rapidly changing environment. New risks emerge from time to time. It is not possible for our management to predict all risks, nor can we assess the impact of all factors on our business or the extent to which any factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statements we may make. In light of these risks, uncertainties, and assumptions, the forward-looking events and circumstances discussed in this Annual Report on Form 10-K may not occur and actual results could differ materially and adversely from those anticipated or implied in the forward-looking statements.

Except as required by applicable law, neither we nor any other person assumes responsibility for the accuracy and completeness of the forward-looking statements. Moreover, the forward-looking statements made in this Annual Report on Form 10-K relate only to events as of the date on which the statements are made. We undertake no obligation to update any forward-looking statements made in this Annual Report on Form 10-K to reflect events or circumstances after the date of this Annual Report on Form 10-K or to reflect new information or the occurrence of unanticipated events, except as required by applicable law. We may not actually achieve the plans, intentions, or expectations disclosed in our forward-looking statements and you should not place undue reliance on our forward-looking statements. Our forward-looking statements do not reflect the potential impact of any future acquisitions, mergers, dispositions, joint ventures, or investments we may make.

In addition, statements that “we believe” and similar statements reflect our beliefs and opinions on the relevant subject. These statements are based upon information available to us as of the date of this Annual Report on Form 10-K, and while we believe such information forms a reasonable basis for such statements, such information may be limited or incomplete, and our statements should not be read to indicate that we have conducted an exhaustive inquiry into, or review of, all potentially available relevant information. These statements are inherently uncertain and investors are cautioned not to unduly rely upon these statements.

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PART I







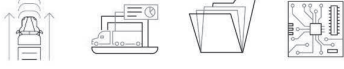
ITEM 1. BUSINESS

Overview of Our Company

When used in this report, the terms “TuSimple”, “Company”, “we”, “us”, and “our” mean TuSimple Holdings Inc. and all subsidiaries.

TuSimple is a global autonomous driving technology company headquartered in San Diego, California, with operations in the United States (“U.S.”) and Asia-Pacific region (“APAC”). Founded in 2015, we are working to revolutionize the estimated \$4 trillion global truck freight market¹ by developing proprietary technologies that enable the scaled development and deployment of autonomous freight transportation. We believe that our full-stack L4² autonomous driving technology and our Autonomous Freight Network (“AFN”) will make global trucking safer, more efficient and environmentally friendly.

TuSimple at a Glance

People, Fleet, and Facilities	 ~800 Employees	 ~70 Trucks U.S.: ~35 / APAC: ~35	 6 R&D Facilities U.S.: San Diego, CA, Tucson, AZ APAC: Beijing, Shanghai, Tangshan Tokyo	 Headquarters U.S. and Corporate: San Diego, CA APAC: Beijing, China / Tokyo, Japan
Go-to-Market Strategy	 TuSimple Freight Capacity	 Carrier-Owned Freight Capacity	 ADS Core Capabilities L2+/L3, System on a Chip (SoC), AV Data, Simulation, Offboard Toolchain	

Reportable Segments

TuSimple’s two reportable geographic segments are the U.S. and APAC. These segments align with our bifurcated development strategy of our L4 autonomous driving technology, independent operations and commercial business models in each region. Each segment has stand-alone engineering teams, software code base, infrastructure, technological capabilities, and onboard software development to fit regional demands and differences in end-market use cases.

For further segment information, see Part II, Item 7: “*Management’s Discussion and Analysis of Financial Condition and Results of Operations*” and Note 13. Segment and Geographic Information of the Notes to Consolidated Financial Statements in Part II, Item 8: “*Financial Statements and Supplementary Data*” of this Form 10-K.

Autonomous Freight Network

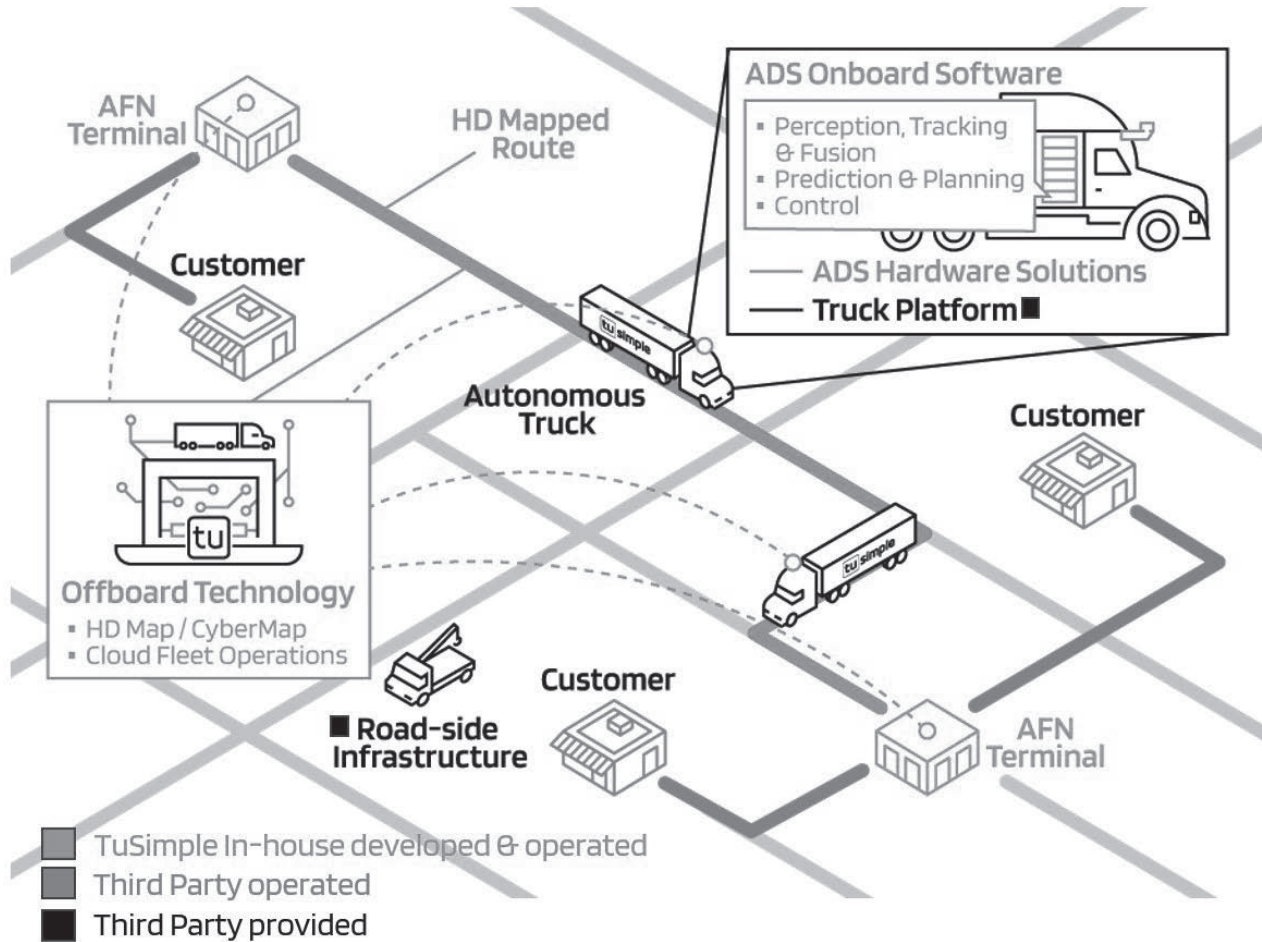
We are in the early stages of developing our AFN in our key markets. For both the U.S. and APAC, we believe the TuSimple Capacity model with retrofitted trucks will enable an accelerated path to commercialization. See section “Service Models” below for a more detailed description of two service models. We have developed proprietary technologies and systems necessary for the development and deployment of our autonomous trucking operations within the AFN. Once fully scaled, the AFN will aim to serve as a comprehensive autonomous freight solution that provides users with access to L4 autonomous semi-trucks operating on HD digital mapped routes connecting a network of terminals.

¹ Armstrong & Associates, Inc., 2019 Global Third-Party Logistics (3PL) Market Analysis.

² Based on the “Levels of Driving Automation” published by the Society of Automotive Engineers (“SAE”).

Here is an illustrative depiction of our AFN operations for our autonomous vehicle ("AV"), using our Automated Driving System ("ADS"):

Illustrative AFN Operations



Full-Stack L4 Autonomous Driving Technology, Hardware and Offboard Capabilities

TuSimple is developing L4 autonomous driving solutions for the U.S. and APAC operations with ADS L4 capable onboard software, offboard capabilities and hardware. The capabilities for the U.S. and APAC segments, including their software base code, are being developed independently by the technology teams in each region.

Our autonomous driving technology is specifically designed for semi-trucks in the geographies where we operate. Our current development priorities and testing activities are focused on further refining our L4 autonomous driving technology to prepare them for commercial deployment. Our proprietary L4 autonomous driving solutions include our L4-capable ADS, such as 1,000 meter perception range, multi-modal perception, and offboard capabilities, such as high definition ("HD") maps, machine-learning, autonomy visualization and simulation capabilities, and an integrated L4 autonomous semi-truck design consisting of a redundant sensor suite, on-board computing solutions, and other components. Long-range perception, advanced planning and decision-making, and highly accurate mapping are important capabilities for the autonomous freight operation of semi-trucks, which are heavy, articulated vehicles that need to be able to operate at highway speeds. See section "Our Core Technologies" below for a more detailed description of our autonomous driving solutions.

Our Operations Today

We currently operate approximately seventy L4 autonomous semi-trucks, being 35 in the U.S. and 35 in APAC, with a safety driver and safety engineer in the cabin (“Driver In”). Operating with a safety driver and safety engineer allows us to continually improve our L4 technology. Currently, our AFN operations consist of the following:

U.S.

- Arizona: Terminal-to-terminal operations
- 35 L4 autonomous semi-trucks (Class 8 trucks)



Class 8 truck illustrative image

APAC

- Shanghai, China: Port-to-terminal testing operations on the Donghai Bridge
- Tokyo, Japan: Testing route on the Tomei Expressway between Tokyo and Osaka
- 35 L4 autonomous semi-trucks (Chassis-over-Engine trucks)



Chassis-over-engine truck illustrative image

Other Locations: We have also conducted select testing operations in other locations in the U.S., China, Japan, and Sweden as we make Operating Design Domain (“ODD”) expansions and demonstrate our capabilities to customers and partners. Currently, we do not have operations in Sweden.

During 2021 and 2022, we generated revenue from freight capacity services to customers via the TuSimple Capacity service model in the U.S. Gross loss margins for our revenue operations in 2021 and 2022 exceeded 100% of revenue given their developmental nature, including having a safety driver and safety engineer in the cabin. Deploying our autonomous trucks in Driver In, data-collection and manual modes in a real world commercial setting, while generating revenue, allowed us to develop our technology and gather important data requirements, as well as establish fleet management operations and related processes well ahead of initiating commercialization. Currently, we believe the incremental benefits and learnings associated with these revenue operations do not outweigh their operating losses. In the fourth quarter of 2022, we de-emphasized revenue-generating freight services and started redeploying the respective resources and learnings to operate our trucks in Driver-In mode and in commercial freight routes but without providing freight services to customers. While we continue to work with select customers in some of our AFN routes, in 2023, we do not plan to generate significant revenue.

Currently, our primary R&D facilities consist of the following:

U.S.

- San Diego, California: technology hub and corporate headquarters (HQ)
- Tucson, Arizona: research and development operations, truck and hardware upfit center, and select technology capabilities

APAC (China)

- Beijing: technology hub, administrative and country HQ
- Shanghai: truck research and development operations, truck and hardware upfit center
- Tangshan, Hebei Province: research and development operations

APAC (Japan)

- Tokyo: research, development, administrative operations and country HQ

Driver Out Operations - Industry Milestone

We have achieved fully Driver Out test runs in the U.S. and APAC. Driver Out means we have successfully operated upfitted L4 autonomous trucks with no human present in the cockpit on a public road (“Driver Out”). We believe that commencing Driver Out runs is a necessary step to building a scalable autonomous trucking solution.

U.S.

In late 2021 through mid 2022, we carried out Driver Out test runs in the U.S. on an 80+ mile freight route in Arizona (between Tucson and Phoenix), covering surface streets, on and off-ramps, and highways. Highlights include:

- No human in vehicle or intervention
- Operating entirely by TuSimple U.S. ADS
- Over 550 miles driven in total
- Zero disengagements (i.e., disengagements for Driver Out generally occurs when the autonomous system takes actions to stop the truck in response to known or unknown L4 software, hardware or ODD issues)

APAC

In June 2023, we carried out Driver Out test runs in China on a 40+ mile route of designated public roads approved by the Shanghai government, including Yangshan Deep-water Port Logistics Park and Donghai Bridge. Highlights include:

- No human in vehicle or intervention
- Operating entirely by TuSimple APAC ADS
- Yangshan Port is one of the world’s largest and busiest container ports with ~20,000 daily truck freight trips
- Driver Out runs conducted during heavy traffic peak hours
- Zero disengagements

Driver Out Expansion

We plan to continue our U.S. and APAC runs on these routes aligned with the regulatory environment, systematically expanding the ODD in which our Driver Out semi-trucks operate and expanding to new routes, with the goal of hauling Driver Out customer freight to capture the opportunity in global freight transportation (see "*Autonomous Freight Transportation Industry*" below).

Autonomous Freight Transportation Industry

We believe autonomous freight transportation has a large addressable market that benefits from technology adoption. TuSimple is focused specifically on the global truck freight market, which is a large and essential industry. Our total addressable market is \$4 trillion globally. In the U.S. and APAC alone, the addressable markets are approximately \$800 billion and \$1.6 trillion, respectively.



Development of Autonomous Trucking

L4³ Automation Focus

The past decade has brought significant progress to vehicle automation technology and we believe this progress is guiding us toward proliferation of higher levels of vehicle automation including L4 autonomous driving. The economic and safety potential of autonomous vehicles has continued to drive substantial investment in the industry, accelerating the pace of technological development. Advanced Driver Assistance Systems (“ADAS”), primarily constituting Level 1⁴ and Level 2⁵ automation, continue to become more sophisticated and prevalent than more advanced systems. The National Highway Traffic Safety Administration reports that 94% of serious crashes are caused by human error. We believe that the safety benefits of vehicle automation are resulting in a coordinated effort between the private sector and regulators toward developing progressively higher levels of automation.

Trucking Autonomy Focus

Solving the safety and cost issues facing the truck freight industry with autonomous technology presents unique opportunities and challenges relative to passenger vehicles. The autonomous design differences stem from the configuration of commercial semi-trucks, their size and weight, the speeds at which they operate, and the way passenger vehicle drivers behave around them. A standard semi-truck with a fully loaded trailer has limited rear visibility and can weigh up to 80,000 pounds which is significantly heavier than the average passenger vehicle. Semi-trucks’ weight, coupled with typical highway driving speeds exceeding 60 miles per hour, require a longer planning horizon and therefore an integrated autonomous software and hardware solution with more comprehensive sensor vision, more robust motion and control capabilities that can manage semi-trucks’ longer planning time periods, and the ability to account for other unique conditions such as the impact of high wind speeds on trailers and on-ramp merging are critical.

We are developing an L4 autonomous technology solution specifically designed for the unique demands of semi-trucks. L4 autonomy is characterized by the ability of the vehicle to perform all driving functions under a given set of pre-specified conditions. We believe that our L4 autonomous capabilities are well suited for “middle mile” truck freight—in which fixed, predictable, and primarily highway routes make up the majority of total miles driven on a shipping route—and we believe that focusing on this opportunity will optimize our path to commercialization.

³ Per the Society of Automotive Engineers (SAE) Automation Levels, *L4 - High Automation* is defined as "Vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle."

⁴ Per SAE Automation Levels, *L1 - Driver Assistance* is defined as "Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design."

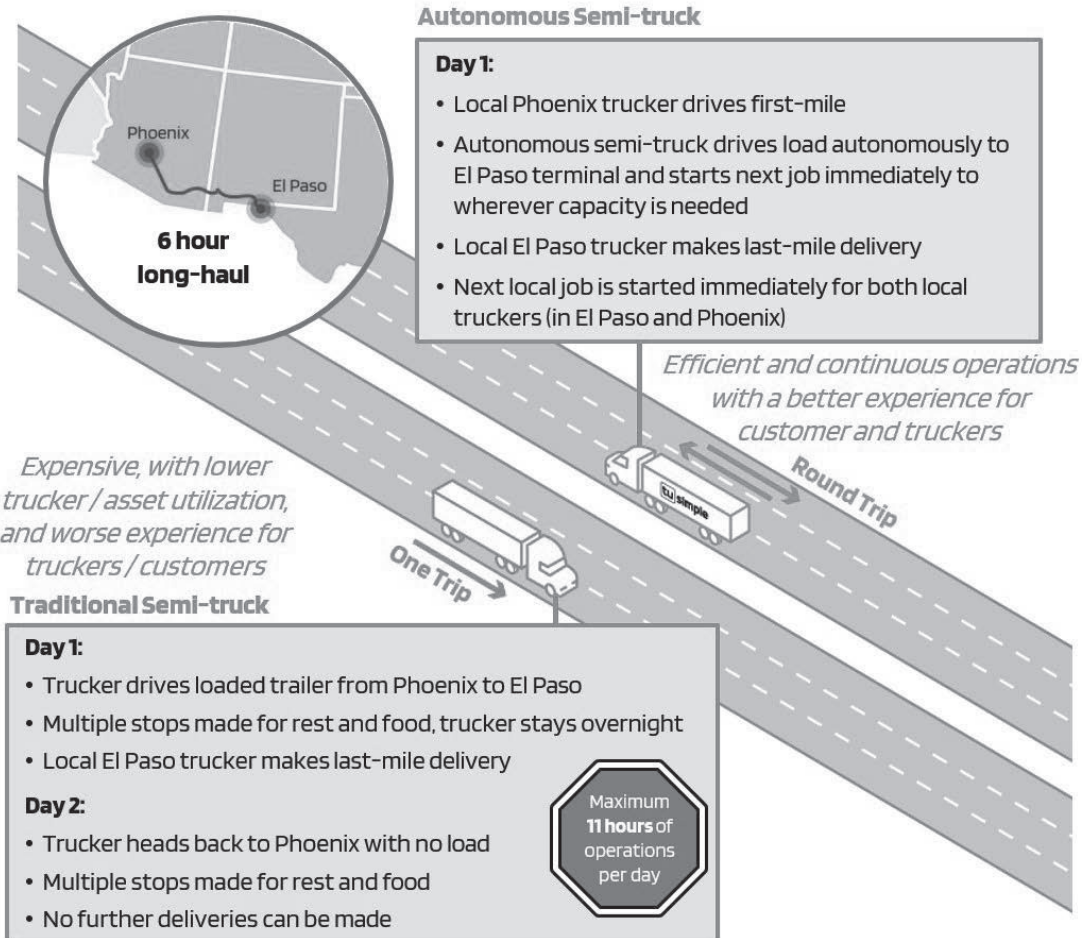
⁵ Per SAE Automation Levels, *L2 - Partial Automation Driver Assistance* is defined as "Vehicle has combined automated functions, like acceleration and steering, but the driver must remain engaged with the driving task and monitor the environment at all times. "

Organic growth

Global growth and trends such as e-commerce same-day shipping have and are expected to continue to further accelerate demand for truck freight and strain traditional freight providers' ability to supply sufficient capacity dynamically and cost effectively. Trucking's current solution to long haul shipping challenges is typically to employ "sleeper teams" of two drivers that alternate driving shifts as semi-truck drivers are legally limited to 11-hour shifts.

The graphic below describes how L4 semi-truck technology can reduce the time required to deliver goods. The demand for dynamic freight delivery is exacerbated by the chronic and worsening driver supply shortage. Once commercialized, we expect our L4 autonomous driving solutions to operate in excess of human time constraints, enhancing asset utilization and availability of freight capacity. In addition, autonomous technology has the potential to reduce fuel consumption and maintenance expenses over time. The following provides an example of the potential efficiencies that autonomous trucking can provide on a hypothetical long-haul trip between two locations in the U.S.:

Autonomous Trucking Intended to Improve Long Haul Productivity



Trucking Industry Challenges

Global trucking is facing substantial challenges in several areas, including driver shortages, safety, efficiency, and carbon footprint, which we believe cannot be fully addressed without technological innovation. Specific industry challenges include:

- **Global driver shortages.** Driver shortages from aging driver workforce, turnover, demographic factors, among other factors, continue to lead to increasing labor costs for the global freight industry, placing upward pressure on the cost and availability of reliable truck freight capacity. For example:
 - The U.S. driver shortage in 2021 was approximately 78,000 and is expected to surpass 160,000 by 2031 according to the American Trucking Association.
 - The number of truck drivers in China (APAC’s largest market) fell from 21 million to 17 million from 2018 to 2020, according to the Ministry of Transport of China, and is expected to continue its decline due to demographic factors.
 - In 2022, 45.2% of Japan’s drivers in the country’s transportation industry were aged 50 or older, according to Japan’s Ministry of Internal Affairs and Communications 2022 report, and such workforce is expected to decline 20% by 2030, pursuant to Roland Berger consultancy.

Our autonomous solution aims to provide users with reliable autonomous freight capacity as a service that is unencumbered by prevailing truck driver shortages.

- **Labor and fuel costs.** In 2022, we estimate that driver costs in the U.S. and APAC represented over 40% and between 20-40%, respectively, of total per mile operating costs of a commercial truck and these costs are expected to continue rising given the driver supply pressures. We believe that removing the driver from middle mile truck freight will provide customers (e.g., shippers, carriers) with cost savings and allow them to reallocate scarce driver resources to first and last mile routes while improving economics through driver removal and lower maintenance costs.

Potential Advantages over Traditional Freight

- ✓ More efficient delivery of cargo due to lack of stoppages necessary for human truck drivers
- ✓ Maintain flexibility of trucking with respect to route and load size
- ✓ Reduced freight costs due to large reduction in labor costs
- ✓ Reduced fuel costs due to AV efficiency
- ✓ Reduced safety costs due to improved driving



- **Trucking crashes.** Trucking safety is a global imperative given the growing accident trends in both established and growing supply chain infrastructures. For example, from 2012 to 2021 in the U.S., the number of persons injured in crashes involving large trucks increased by over 48% per National Highway Traffic Safety Administration crash statistics. We believe that the adoption of autonomous technology in trucking will significantly reduce the number of accidents caused by distracted or impaired driving, regimenting safer driving practices and operating more predictably.
- **Freight efficiency/resiliency.** Truck freight operations along defined and repeatable routes, particularly in the middle mile, allow L4 autonomy to reliably fulfill the requirements of the industry while reducing the number of edge cases that must be solved by the autonomous software. We believe it is important for L4 autonomous semi-trucks to travel on surface streets as well as highways to carry freight from terminal to terminal to minimize drayage costs and increase operational efficiency. As a result, we also focus our autonomous capabilities on navigating surface streets in order to provide terminal to terminal transportation rather than requiring a highway “off-ramp” location farther from our users.
- **Underinvestment in technological advancements.** The global truck freight industry today is highly fragmented and is characterized by low profit margins—generally in the single digits—which we believe makes it difficult for existing stakeholders to invest in technological advancement. We believe that the improved margins and economics from autonomous freight capacity will attract more investment and global capital to the industry to further enhance global technology.

Unique Market Factors

The markets where we currently operate are not only the largest in the world, but each has unique factors that make autonomous freight capacity and technology adoption compelling.

U.S.⁶

- ~\$800 billion addressable market
- ~3 million Class 8 semi-trucks in the U.S. with total mileage of 2 trillion kilometers per year
- 70+% of all freight in the U.S. transported by trucks
- +10% of the U.S. trade corridors account for moving nearly 80% of all transported goods

APAC - China⁷

- ~\$900 billion addressable market
- ~8 million heavy-duty trucks (HDTs) with total mileage of 2 trillion kilometers per year
- HDT inter-city market (middle mile) accounts for ~60% of total truck freight market

APAC - Japan⁸

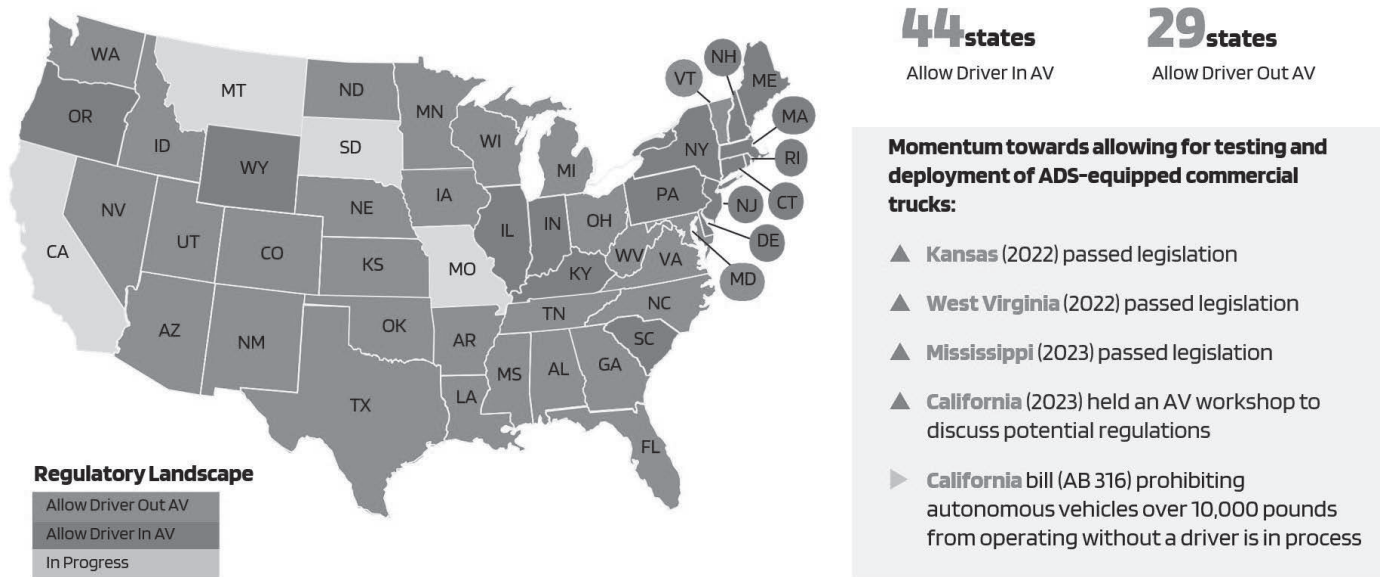
- ~\$150 billion addressable market
- ~1.2 million large-size trucks (~1 million van-type HDT trucks and 200,000 semi-trucks)
- Long-haul road transportation routes in Japan are highly concentrated in the freight corridor (~50% of total) that connects the major cities of Tokyo, Nagoya, and Osaka (approximately 600 kilometers in aggregate)

Regulatory Progress for Autonomous Driving Globally

The global development of autonomous driving standards and legislation is moving at a varied pace.

U.S.

The U.S. Department of Transportation has stated: “the United States Government is committed to fostering surface transportation innovations to ensure the United States leads the world in automated vehicle technology development and integration while prioritizing safety, security and privacy and safeguarding the freedoms enjoyed by Americans.” Today, 44 states allow autonomous semi-truck testing, of which 29 states allow autonomous semi-truck commercial deployment.



⁶ American Trucking Association

⁷ China's National Bureau of Statistics, IHS Markit and BCG analysis

⁸ Japan's MLIT (Ministry of Land, Infrastructure, Transport and Tourism) and JTA (Japan Trucking Association)

APAC

The regulatory environment for autonomous driving in the APAC region also is supportive of autonomous freight.

- **China.** The Chinese government encourages autonomous driving via high-level guidance and execution support and sets clear strategic development goals for the AV industry by 2025, promoting all-round development framework and L4 autonomous vehicle commercialization. Today, autonomous vehicle testing activities in China are regulated by the local government and autonomous vehicle companies need to obtain approval and licenses from local governments to conduct fully driverless testing and commercial operation in public roads. In June 2023, Shanghai became the first city in China to pass legislation to allow Level 4 fully driverless testing of autonomous trucks. TuSimple is among the first companies to receive the Fully Driverless Test License.
- **Japan.** The Japanese government has set targets for commercial operation of SAE Level 4 fully autonomous trucks by 2026. Today, autonomous truck testing is allowed in most highways and local roads in Japan under the conditions of compliance with road traffic laws and testing guidelines. In March 2023, the Japanese government announced plans to launch a self-driving lane on some sections of the New Tomei Expressway by 2024 (Tokyo-Nagoya), which will allow us to expand our testing operations in the country.

Commercialization

Readiness - Tech and AFN development

We anticipate commercialization for TuSimple to be achieved through scaled deployment of L4 autonomous trucks using our service models in our AFN. We are in the early stages of developing our AFN in our key markets. We believe that to achieve a meaningful share of the truck freight market, the scale of our network solution is critical. While removing the driver from the semi-truck is highly attractive on a unit economics basis, the solution is not viable for customers without a high density of HD mapped routes, terminals, and supporting operations. Once scaled, we believe that our AFN will be highly complementary with our L4 autonomous semi-trucks' capability to operate from terminal to terminal, minimizing drayage and driving operational inefficiency. We are also developing an L4 autonomy solution needed to enable commercialization in the U.S. and APAC. See section "Our Core Technologies" below for a more detailed description of our autonomous driving technology and capabilities.

Service Models

We are developing our AFN to provide autonomous freight capacity as a service through two service models based on users' needs:

- **TuSimple Capacity.** Our fleet of owned or leased retrofitted (near-term) and purpose-built L4 autonomous semi-trucks (longer-term) aims to serve customers that desire access to safe, reliable, low cost, and more environmentally friendly freight transportation without owning semi-truck assets.
- **Carrier-Owned Capacity.** Customers that prefer to own their fleet will be able to purchase our purpose-built L4 autonomous semi-truck from an OEM with on-board autonomous driving software solutions.

TuSimple Capacity



- TuSimple operates automated freight route
- TuSimple trucks (owned / leased)
- Priced at discount to traditional truck freight due to advantaged cost structure

Earn \$ / mile freight rate

Customer Benefits

- ✓ No upfront capex
- ✓ Per-mile savings vs. human driven truck

Carrier-Owned Capacity



- TuSimple enables OEMs to manufacture autonomous trucks
- TuSimple provides software and remote monitoring
- Sustainable margin profile
- Dependent on OEM manufacture timelines

Earn \$ / mile subscription fee

Customer Benefits

- ✓ Attractive total cost of ownership
- ✓ Less than one year payback for incremental AV equipment
- ✓ Control over network

TuSimple Capacity: Path to Commercialization

For both the U.S. and APAC, we believe the TuSimple Capacity model with retrofitted trucks will enable an accelerated path to scale. We believe prioritizing this service model provides us several compelling benefits:

- Control of commercialization path, autonomous lane deployment, and system and hardware integration ahead of industry readiness.
- Generation of revenue in concentrated lanes or markets while business and industry matures.
- Economies of scale in related AV service operations (e.g., rescue operations, fueling, etc.) within concentrated lanes.

TuSimple Capacity’s early focus on retrofitted trucks is intended to allow for continued development, integration and validation under our control while OEM purpose-built capabilities are designed, validated and production infrastructure is ramped up.

Roadmap

Our U.S. and APAC commercialization roadmaps consist of three major phases and are strategically aligned with overall industry readiness.

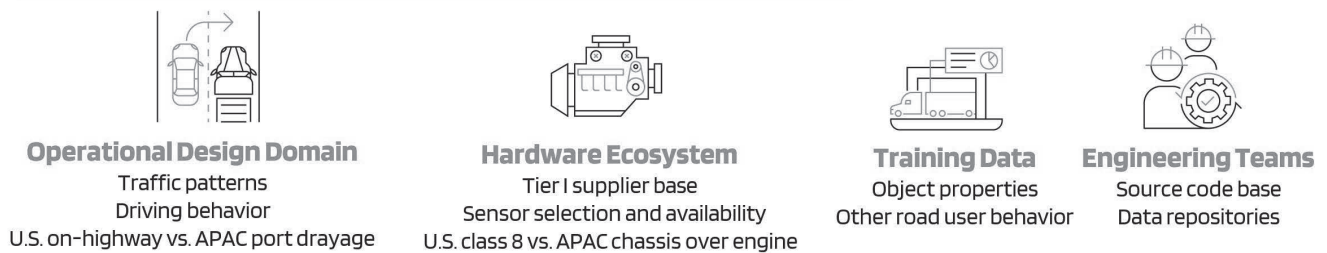
- **TuSimple Capacity - Retrofitted Trucks (Near-Term).** Primarily focused on maturing our ADS technology for commercializing select freight routes and developing our AV-ready redundant base truck platforms & components to support OEM production programs.
- **TuSimple Capacity - Retrofitted and Purpose Built L4 Trucks (Mid-Term).** Aligned with longer OEM and Tier-1 supplier timelines. We expect that this phase will be primarily focused on expanding our self-operated L4 truck fleet and AFN lanes, continuing hardware maturity and optimization, and freezing complete ADS onboard software and hardware for OEM production programs.
- **TuSimple and Carrier-Owned Capacity Purpose Built L4 Trucks (Long-Term).** Phase slated with the launch of OEM production vehicles. We anticipate that it will be primarily focused on scaling AFN density.

Our Core Technologies

Autonomy Technology and Capabilities

We are developing an L4 autonomy solution for both our U.S. and APAC operations with capabilities from a hybrid data-driven and principle-based framework with redundant architecture, utilizing a proprietary camera-centric architecture. The development and testing of TuSimple’s L4 autonomy solutions in the U.S. and APAC are carried out independently as they have unique ODDs (e.g., road ecosystems, traffic rules, infrastructure and driver behavior) and hardware ecosystems (e.g., Class 8 trucks in the U.S. and Chassis-over-Engine trucks in APAC), which require separate engineering teams, software code base and systems integration to properly differentiate the product roadmaps per the end-market use cases.

Key Development Differences Between the U.S. and APAC



The combined technology platform and organizational capability for each region encompass the overarching requirements to support continuous, scalable autonomous freight operations.

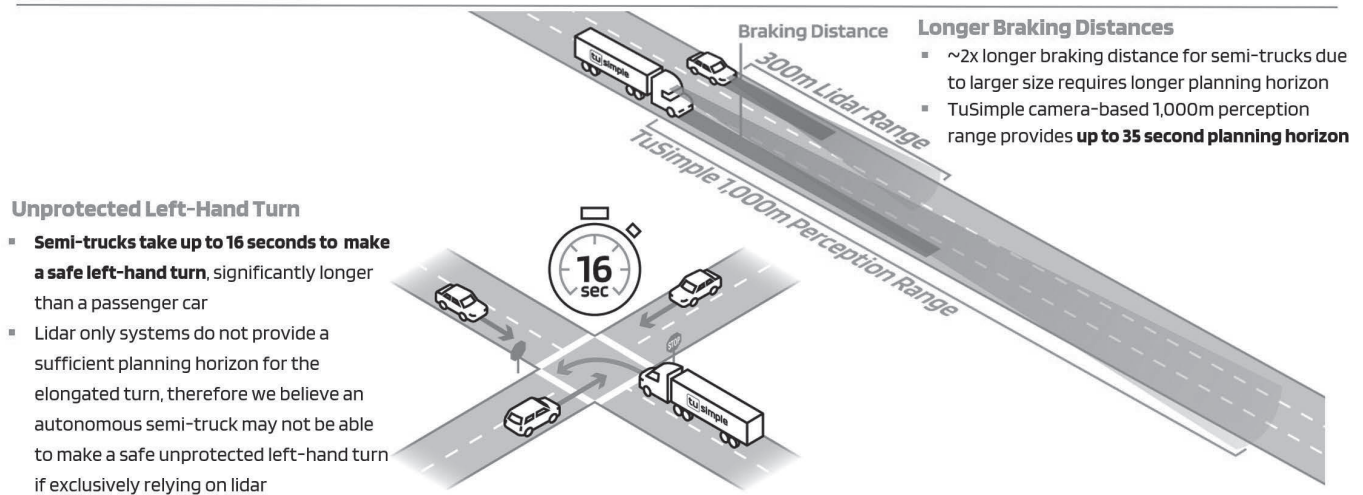


Note: While the following descriptions apply to the U.S. and APAC capabilities, some illustrative examples may only apply to one segment.

Perception, Tracking and Fusion

Visualizing the road environment with long-range capabilities that address highway driving speeds and long stopping distance requirements is critical to our L4 autonomous semi-trucks' safe and reliable operation. Our perception system is powered by proprietary artificial intelligence technology and, when coupled with our proprietary camera module, enables the semi-truck's 1,000 meter perception range. Semi-trucks can take twice the distance as a passenger car to stop and this range across lighting environments is designed to provide our trucks with sufficient reaction time to safely operate at highway speeds. Our camera-centric system is powered by both primary and backup cameras. Augmenting the camera perception is an array of LiDAR, radar systems, GPS, and ultrasonic sensors. With the exception of our specially designed long range high definition camera, we have sourced the balance of our sensor suite from existing third party vendors in order to reduce the cost of the overall system. Our sensor fusion technology actively integrates and fuses data from the various sensors (e.g. camera + LiDAR + radar) and HD maps to perceive, understand and create a detailed 3D representation of the surrounding environment, which we believe is critical to operate L4 autonomous semi-trucks.

Potential Benefits of Long-Range Perception



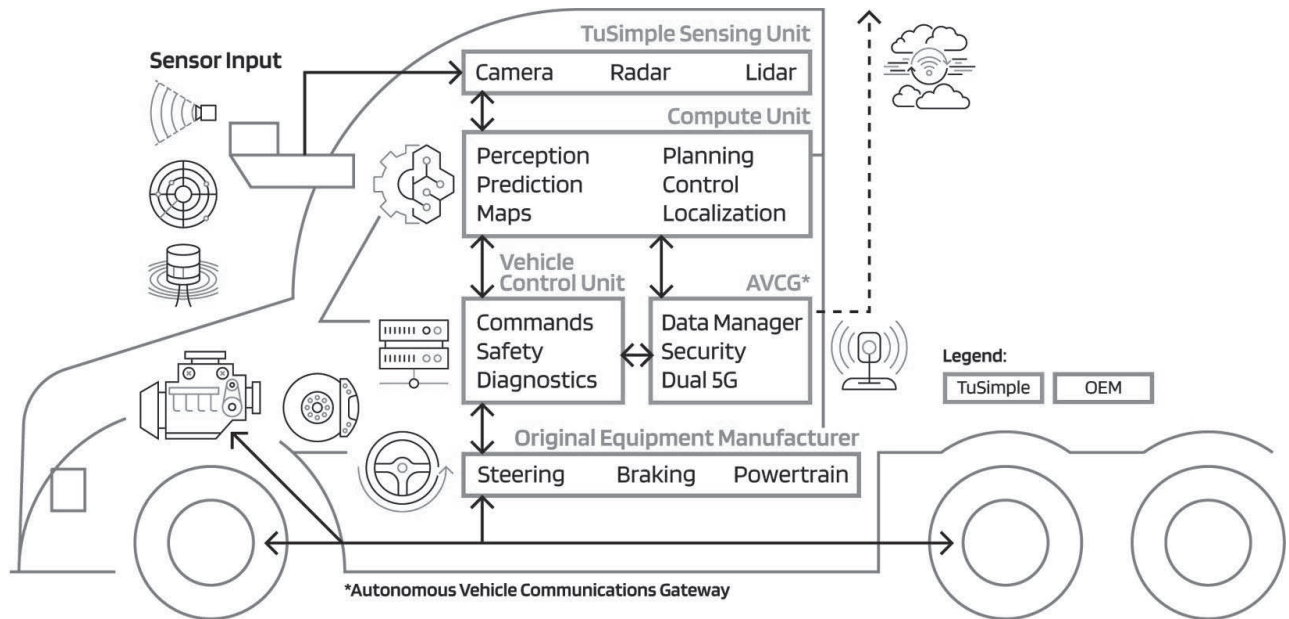
Prediction and Motion Planning

Our motion planning software is designed to complement our proprietary perception system by predicting the future paths of surrounding vehicles as well as analyzing diverse traffic scenarios. By utilizing prediction models that assess vehicle speeds and driver intent and evaluating other conditions or objects, we aim to plan better and safer driving trajectories for our semi-trucks through all types of interactions in the ODD. We aim to develop our systems' ability to accurately forecast the behavior of compliant and non-compliant drivers to significantly increase the safety of our purpose-built L4 autonomous semi-trucks relative to human drivers.

Control

Our control algorithms receive input from the motion planning module to put into action a safe and efficient driving trajectory. These algorithms are designed specifically for the semi-truck use case, as semi-trucks are significantly less nimble than passenger cars, with characteristics including longer gear shift timeframes and the need for higher actuation accuracy. Control algorithms are tightly coupled with prediction and planning by providing probabilistic outputs for control to take defensive actions.

Since our inception, we have developed and have continued to refine several critical ADS-enabling hardware in the U.S. and APAC through multiple generations which enables safety, reliability, and cost reduction with in-house designed software. We leverage off-the-shelf sensors or components in the U.S. and APAC where possible to remain capital efficient and focused on core competencies. Below is a simple illustration of our hardware framework:



Notes:

- This illustration shows TuSimple’s hardware framework for a U.S. Class 8 Truck. While the APAC Chassis-over-Engine is different in size, the hardware framework is not materially different from the one illustrated.
- TuSimple Sensing Unit - Sensor preprocessing unit for all L4 sensors
- Ruggedized Compute Unit - Central computing unit for driving function and overall L4 orchestration
- Vehicle Control Unit - Auto-grade ECU for direct command control of steering, powertrain, and braking
- Autonomous Vehicle Communications Gateway (AVCG) - Ruggedized controller handles AV truck bi-directional communications
- These hardware components are built by third party suppliers. TuSimple is responsible for the respective embedded software.

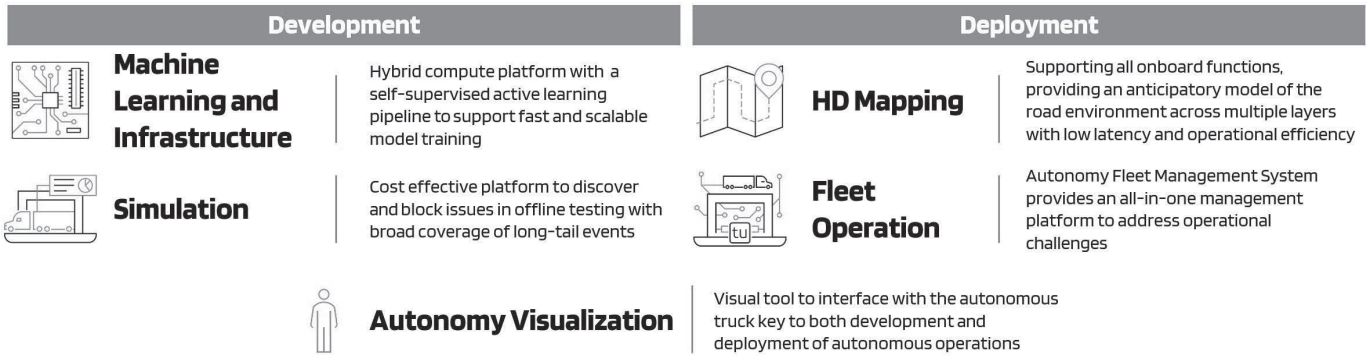
Autonomous Truck Upfit Capabilities

TuSimple has been developing autonomous semi-truck technology for over eight years, and is now on its eighth generation vehicle in the U.S. and its fifth in APAC, upfitting and integrating with multiple OEMs.

TuSimple Domain Controller

In 2022, we entered into a partnership with NVIDIA, a leading graphical computing technology company, to develop a proprietary ADC computing solution named the TuSimple Domain Controller (“TDC”). The TDC is a central on-board computer that is being developed by our APAC team in an effort to execute hundreds of trillions of operations per second for our autonomous driving system, including our perception, planning and control systems. The TDC is designed to replace multiple existing compute units as an integrated redundant controller. This first generation TDC has the ability to address multiple use-cases, including centralized compute for L2+/L3 autonomous solutions and redundant compute for L4 autonomous solutions. We have developed the TDC for use in our upfitted semi-trucks. However, we believe the TDC has broader applications in the L2+/L3 autonomy market as a standalone compute unit or an integrated hardware and autonomous software offering.

We have developed in-house the corresponding toolchains that we intend to support a scalable autonomous freight operation.



Machine Learning Infrastructure

The accuracy of our perception and motion planning capabilities is augmented by our proprietary machine learning algorithms. Over the course of more than 10 million road miles in both the U.S. and APAC, we have accumulated a vast set of semi-truck specific driving data to train our perception and motion planning capabilities. We focus our data collection and storage efforts on both quality and quantity. This enables our database to be informative and relatively easily analyzed by our machine learning software. This data analysis trains our software to more accurately predict how the surrounding environment of a semi-truck will change in real time.

Simulation

TuSimple simulation capabilities are critical enablers to accelerate the development and refinement of our autonomous trucking technology. Our simulation capabilities allow us to train and refine our onboard software (e.g., prediction, motion planning, control) in a simulated virtual environment using real-time, synthetic road mile data. We believe our simulation capabilities have several benefits:

- **Safety and cost efficiency.** Less on-road testing with lower development costs per mile versus on-road testing
- **Development augmentation and scale.** Simulate the equivalent of over 10,000 trucks on the road by customizing thousands of real on-road scenarios to stretch all possible driver behavior and ODD permutations, including on-road conditions, weather, and other driver behaviors.

Proprietary HD Mapping Capability

We believe that integrated mapping software with rapid updating is crucial for the operation of an L4 autonomous semi-truck. Our AFN consists of HD digital maps of the lanes over which our semi-trucks operate and our in-house mapping technology can quickly map new routes and provide users with more location options for shipping on our AFN. Precise localization accuracy is crucial to safely operate semi-trucks autonomously.

Fleet Operation

Our customer user experience is complemented by our proprietary fleet management systems, which include control center and fleet scheduling systems. This cloud-based autonomous system is being designed to ensure safe operations, reliability, and efficient capacity for our users. The system will be designed to directly connect to our users' fleet management software.

Visualization

Versatile and comprehensive visualization is critical to optimize the development and refinement of our autonomous driving systems. Our visualization platforms accommodate various scenarios from different users, including offline triage and research engineers, and test operators. In addition, our visualization platforms allow for a more efficient and centralized AV development with key shared components, including 3D display, data plotting, process monitoring, and dynamic parameter reconfiguration.

System Integration & Safety

We aim to design safety-critical best practices in all major operational processes (“the TuSimple Safety Case”), which includes the formal and documented safety-critical design methodologies, rigorous verification and validation against safety critical requirements and close coordination with regulators. In 2022, we passed an independent 3rd party (TÜV SÜD) safety audit to SAE standard J3018 and AV testing best practices with zero nonconformities.

Intellectual Property

Our ability to be at the forefront of innovation in the autonomous freight market largely depends on our ability to obtain, maintain, and protect our intellectual property (“IP”) and other proprietary rights relating to our key technology, and our ability to successfully enforce these rights against third parties. To accomplish this, we rely on a combination of intellectual property rights, such as patents, trademarks, copyrights, and trade secrets (including know-how), in addition to employee and third-party non-disclosure agreements, intellectual property licenses, and other contractual rights. Our success also depends in part on our ability to operate without infringing, misappropriating, or otherwise violating the intellectual property and proprietary rights of others, and in part, on our ability to prevent others from infringing, misappropriating, or otherwise violating our intellectual property and proprietary rights. A comprehensive discussion on risks relating to intellectual property is provided under Item 1A, Part 1 - Risk Factors , under section "*Risks Related to Our Intellectual Property, Information Technology, and Data Privacy*" of this Form 10-K.

Our patent portfolio of 500+ global issued patents has IP spanning across the entire autonomous freight ecosystem and serves as inherent value to TuSimple shareholders. As of December 31, 2022, we had 519 issued patents and approximately 1,025 pending patent applications globally. As of June 30, 2023, we had approximately 590 issued patents globally and approximately 1,170 pending patent applications.

Government Regulation

The global development of autonomous driving standards and legislation is moving at a varied pace. We believe that the current regulatory environment in our key markets in the U.S. and APAC presents a clear path for L4 autonomous semi-trucks. See section “Regulatory Progress for Autonomous Driving Globally” above for more information on the evolution of regulatory progress for AV operations in our major markets. See "*Risks Related to Regulations*" section at Item 1A below.

Environmental

Our operations in the U.S. and APAC are subject to various international, federal, state, and local laws and regulations governing pollution and protection of the environment, the use, generation, storage, management, discharge, transportation, disposal, and release of, and human exposure to, hazardous and toxic materials, and the occupational health and safety of our employees.

International

In order for us to operate in international markets outside of the U.S., we must comply with relevant legal regulations regarding autonomous vehicles as well as technology export control, data security, cybersecurity and other related regulations that apply to global technology companies. We have developed compliance processes and procedures related to these regulatory requirements and believe that we are in compliance with such requirements. We do not believe there are any regulatory restrictions that would materially impact our ability to operate in our key markets. We are in regular dialogue with the relevant regulatory policy bodies globally and intend to continue to comply with global regulations. See "*Risks Related to Our International Operations*" section at Item 1A below.

Autonomous Driving

At the federal level in the U.S., the safety of commercial motor vehicles is regulated by the U.S. Department of Transportation through two federal Agencies – the National Highway Traffic Safety Administration (“NHTSA”) and the Federal Motor Carrier Safety Administration (“FMCSA”). NHTSA establishes the Federal Motor Vehicle Safety Standards (“FMVSS”) for motor vehicles and motor vehicle equipment and oversees the actions that manufacturers of motor vehicles and motor vehicle equipment are required to take regarding the reporting of information related to defects or injuries related to their products and the recall and repair of vehicles and equipment that contain safety defects or fail to comply with the FMVSS. FMCSA regulates the safety of commercial motor carriers operating in interstate commerce, the qualifications and safety of commercial motor vehicle drivers, and the safe operation of commercial trucks.

While there are currently no federal U.S. regulations expressly pertaining to the safety of autonomous driving systems for trucks, the U.S. Department of Transportation has established recommended voluntary guidelines, and NHTSA and FMCSA have authority to take enforcement action should an automated driving system pose an unreasonable risk to safety or inhibit the safe operation of a commercial motor vehicle. Certain U.S. states have legal restrictions on autonomous driving vehicles, and many other states are considering them. This patchwork increases the legal complexity for our purpose-built autonomous trucks. Autonomous driving laws and regulations are expected to continue to evolve in numerous jurisdictions in the U.S. and foreign countries and may create restrictions on autonomous driving features that we develop.

Other key markets, including those in the APAC region, continue to consider self-driving regulation. Any implemented regulations may differ materially from those in the U.S., which may further increase the legal complexity of self-driving vehicles and limit or prevent certain features.

Safety and Testing

As the trucks that carry our technology go into production, we are subject to existing stringent requirements overseen by NHTSA under the National Traffic and Motor Vehicle Safety Act of 1966 (the “Vehicle Safety Act”), including a duty to report, subject to strict timing requirements, safety defects with our products. The Vehicle Safety Act imposes potentially significant civil penalties for violations, including the failure to comply with such reporting actions. We are also subject to the existing U.S. Transportation Recall Enhancement, Accountability and Documentation Act (the “TREAD Act”), which requires motor vehicle equipment manufacturers, such as us, to comply with “Early Warning” requirements by reporting certain information to NHTSA, such as information related to defects or reports of injury related to our products. The TREAD Act imposes criminal liability for violating such requirements if a defect subsequently causes death or bodily injury.

In addition, the Vehicle Safety Act authorizes NHTSA to require a manufacturer to recall and repair vehicles that contain safety defects or fail to comply with U.S. federal motor vehicle safety standards. Sales into foreign countries may be subject to similar regulations. As the development of federal and state regulation of autonomous machines and vehicles continues to evolve, we may be subject to additional regulatory schemes. See *"Our business may be adversely affected by changes in automotive safety regulations, enforcement of such regulations, or concerns that drive further regulations of the automobile safety market"* section at Item 1A below.

Our truck drivers and trucking operations are subject to the Federal Motor Carrier Safety Regulations (the “FMCSRs”) established by FMCSA, and we are subject to the requirements of the federal Occupational Safety and Health Act, as amended (“OSHA”), and comparable international, state, and local laws that protect and regulate employee health and safety.

Our operations outside of the U.S. are subject to similar foreign compliance, safety, environmental and other regulations. Many of those regulations are different from those applicable in the U.S. and may require redesign and/or retesting.

For example, in China, when our products or vehicles equipped with our products enter into the stage of mass-production, we will be subject to the Product Quality Law, which requires industrial products that may be hazardous to human health and personal or property safety, such as vehicles and accessories, to meet certain safety standards. In addition, our products are also subject to the Regulations on the Administration of Defective Automobile Product Recall and Measures for the Implementation of Regulations on the Administration of Defective Automobile Product Recall, which may lead to liability if a defect is caused by our products. Any violation of the above laws and regulations may cause civil, administrative, and even criminal liabilities. Since there is not a specific vehicle safety law in China, the rules might scattered across other regulations. In February 2023, Shanghai officially launched and implemented the "Implementation Rules for Promoting the Innovation and Application of Fully Driverless Intelligent Connected Vehicles," which is the first local legislation in China focused on the innovation and application of fully driverless intelligent and connected vehicles. It provides a legal foundation and institutional support for fully driverless intelligent connected vehicles to carry out various innovation and application activities such as on-road testing, demonstrations, and commercial operations in Lingang New Area. See *"Risks Related to Our International Operations"* section at Item 1A below.

Competition

We believe our main source of competition in the U.S. and APAC come from technology companies building autonomous vehicle self-driving applications and semi-truck original equipment manufacturers (“OEM”) building internal self-driving development programs. We believe that our AFN solutions in the U.S. and APAC will address key supply and demand pain points faced by the industry today and that our technology will make truck freight cheaper and carrier operations significantly safer and more efficient.

While we face technological competition from technology companies building autonomous vehicle self-driving applications, we believe that our exclusive focus on the semi-truck use case differentiates us from other autonomous vehicle companies. L4 autonomous semi-trucks present distinct challenges relative to autonomous passenger vehicles, and we believe that overlap in technological capabilities is limited.

Given the technical expertise and breadth of our talent in the U.S. and APAC, robust full-stack L4 autonomy technology and capabilities, Driver Out industry milestones, extensive patent portfolio, commercialization plans and progress, we believe that we are able to compete favorably across these factors.

Sustainability

Fostering a sustainable environment is foundational to TuSimple's values. We believe commercialization of our autonomous freight solutions globally will contribute to a reduction of fuel consumption and greenhouse gas emissions. Rising freight volumes are driving significant levels of commercial truck greenhouse gas emissions. The transportation industry is responsible for 30% of U.S. greenhouse gas emissions and medium and heavy duty trucks make up nearly a quarter of the industry's emissions per "Fast Facts on Transportation Greenhouse Gas Emissions" by the U.S. Environmental Protection Agency. Based on the results of an internal study conducted with the University of California San Diego and empirical data from our users comparing performance of our autonomous driver compared to human drivers, we believe our solution can deliver over 10% better fuel efficiency than traditional trucking through optimized truck control and driving operations, which can deliver reductions in greenhouse gas emissions.

Our People and Culture

We pride ourselves on the talent, passion, and dedication of our employees, who are united in our goal to revolutionize the global freight market. As of December 31, 2022 and June 30, 2023, we had approximately 1,450 and 1,058 full-time global employees, respectively. This global employee number includes U.S. employees that were part of a previously announced restructuring program and employed at the time under the 60-day Worker Adjustment and Retraining Notification (WARN) relief program. Excluding employees under WARN, as of December 31, 2022 and June 30, 2023, we had approximately 1,100 and approximately 810 full-time global employees, respectively. None of our global employees are represented by a labor union, and we consider our employee relations to be in good standing.

We believe we foster a values-based culture that emphasizes values such as striving for excellence, transparency, and support for each other. Our employees have access to development stipends and training, different career paths, and, most importantly, challenging and purposeful work. Our culture is also built on diversity, inclusion, camaraderie, and celebration. We organize cultural events, team building activities, and public recognition forums to celebrate our diversity.

Apart from culture and career development, we offer a benefits package. This package includes vacation days, paid parental leave, 401(k), bonuses, employee equity programs, and a wide selection of health and wellness benefit plans for employees and their dependents. We also proactively survey and host roundtables with our employees to gather feedback and better understand their needs and perspectives and aim for changes to our employee programs are impactful.

Corporate Information

Our corporate headquarters and principal executive offices are located at 9191 Towne Centre Drive Suite 600, San Diego, California 92122, and our telephone number is (619) 916-3144.

Our website address is www.tusimple.com. Information contained on, or that can be accessed through, our website does not constitute part of this Annual Report on Form 10-K, and you should not consider information on our website to be part of this Annual Report on Form 10-K. Our Annual Reports on Form 10-K, Quarterly Reports on Form 10-Q, Current Reports on Form 8-K, and amendments to reports filed pursuant to Sections 13(a) and 15(d) of the Securities Exchange Act of 1934, as amended, or the Exchange Act, are filed with the SEC. Such reports and other information filed by us with the SEC are available free of charge on our investor relations website (www.ir.tusimple.com) when such reports are available on the SEC's website. The SEC maintains an internet site that contains reports, proxy and information statements and other information regarding issuers that file electronically with the SEC at www.sec.gov. The information contained on the websites referenced in this Annual Report on Form 10-K is not incorporated by reference into this filing. Further, our references to website URLs are intended to be inactive textual references only.

We announce material information to the public through filings with the SEC, the investor relations page on our website, press releases, public conference calls, and webcasts in order to achieve broad, non-exclusionary distribution of information to the public and for complying with our disclosure obligations under Regulation FD. We encourage investors, the media, and others to follow the channels listed above and to review the information disclosed through such channels. Any updates to the list of disclosure channels through which we will announce information will be posted on the investor relations page on our website.

ITEM 1A. RISK FACTORS

Certain factors may have a material adverse effect on our business, financial condition, results of operations and prospects. You should carefully consider the risks and uncertainties described below, together with all of the other information in this Annual Report on Form 10-K, including the section titled “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and our consolidated financial statements and the accompanying notes, included elsewhere in this Annual Report on Form 10-K. Our business, financial condition, results of operations, or prospects could also be harmed by risks and uncertainties not currently known to us or that we currently do not believe are material. If any of these risks actually occur, it may materially harm our business, financial condition, liquidity, results of operations, prospects, and the market price of our Class A common stock.

Risk Factors Summary

An investment in our securities involves various risks. Such risks, including those set forth in the summary of material risks in this Item 1A, should be carefully considered before purchasing our securities.

- We may be subject to risks associated with potential transactions related to our exploration of strategic alternatives. The failure to complete a potential transaction could adversely affect our business, results of operations, financial condition, and the market price of our Class A Common Stock.
- Our failure to timely file periodic reports with the SEC may result in the delisting of our Class A Common Stock.
- Autonomous driving is an emerging technology and involves significant risks and uncertainties.
- We have a limited operating history in a new market and face significant challenges as our industry is rapidly evolving.
- Unfavorable media coverage and publicity negatively affects our business from time to time.
- We may be subject to product liability or warranty claims that could result in significant direct or indirect costs, including reputational harm, increased insurance premiums, or the need to self insure, which could adversely affect our business and operating results.
- We rely on our relationships with OEMs, business partners and other industry participants and depend on them for a substantial portion of the development and integration of our AFN. Business collaboration with partners is subject to risks, which could have a material adverse impact on our business, financial condition, and results of operations.
- We are an early-stage company with a history of losses and expect to incur significant expenses and continuing losses for the foreseeable future.
- We expect to need to raise additional funds and these funds may not be available to us on attractive terms when we need them, or at all. If we cannot raise additional funds on attractive terms when we need them, our operations and prospects could be negatively affected.
- We depend on the experience and expertise of our senior management team, engineers, and employees. Our inability to recruit and retain executive officers, engineers, and qualified employees could harm our business, operating results, and financial condition.
- Our management team has limited experience managing a public company.
- Our workforce was recently reduced, which, along with our exploration of strategic alternatives and other additional factors, could impact the speed of our business development and our ability to retain and attract talent.
- If we fail to manage our growth effectively, we may be unable to execute our business plan, maintain high levels of service, or adequately address competitive challenges.
- If our L4 autonomous semi-trucks fail to perform as expected, our ability to develop our AFN and market, sell, or lease our purpose-built L4 autonomous semi-trucks could be harmed. Future product recalls involving our purpose-built L4 autonomous semi-trucks or hardware deployed on our L4 autonomous semi-trucks could materially and adversely affect our business, prospects, operating results, and financial condition.
- We have identified, and may in the future identify, material weaknesses in our internal control over financial reporting.

- Our business has been, and may continue to be, adversely affected if we are unable to adequately establish, maintain, protect, and enforce our intellectual property and proprietary rights or prevent third parties from making unauthorized use of our technology and other intellectual property rights.
- Unauthorized control or manipulation of systems in autonomous semi-trucks may cause them to operate improperly or not at all, or compromise their safety and data security, which could result in loss of confidence in us and our products and services, termination of contracts with certain of our partners and harm our business.
- We are and may continue to be subject to claims, lawsuits, government actions, inquiries or investigations, and other proceedings that may adversely affect our business, financial condition, and results of operations.
- We are subject to substantial regulations, including regulations governing autonomous vehicles, and unfavorable changes to, or failure by us to comply with, these regulations could substantially harm our business and operating results.
- Our operations in China are subject to significant government regulation, as well as a variety of legal, political, and economic risks. If the Chinese government modifies its laws and regulations, or interprets and enforces these laws and regulations in a manner that is adverse to our business in China, our consolidated business and results of operations may be materially harmed.
- We face risks associated with our international operations and expansion to new markets, including unfavorable regulatory, political, tax, and labor conditions, which could harm our business.
- Investments in us have been, and may be subject to, U.S. foreign investment regulations which may impose conditions or limitations on certain investors (including, but not limited to, limits on purchasing our common stock, limits on information sharing with such investors, requiring a voting trust, governance modifications, forced divestiture, or other measures).
- We are subject to various requirements and restrictions under the NSA with the CFIUS, both defined below, and we have incurred and expect to incur significant costs to comply with those requirements and may be subject to monetary penalties and/or the appointment of a third-party monitor if we do not comply with the requirements and restrictions under the NSA or if CFIUS determines, at their election, to require us to appoint a third-party monitor. In addition, restrictions under the NSA could limit our business activities.
- The dual class structure of our common stock has the effect of concentrating voting control with certain stockholders, in particular, our Founders, which will limit your ability to influence the outcome of important transactions, including a change in control.
- We are a "controlled company" as defined in the Nasdaq Listing Rules and, as a result, qualify for exemptions from certain corporate governance requirements. You may not have the same protections afforded to stockholders of companies that are subject to such requirements.
- Our failure to timely and effectively implement controls and procedures required by Section 404(a) and Section 404(b) of the Sarbanes-Oxley Act could have a material adverse effect on our business.
- We are and may continue to be subject to securities litigation, which is expensive and could divert our management's attention.
- Anti-takeover provisions in our charter documents may discourage our acquisition by a third party, which could limit our stockholders' opportunity to sell their shares, at a premium.
- The market price and trading volume of our common stock has been volatile and may continue to face negative pressure, including as a result of future sales or distributions of our common stock.

Risks Relating to our Exploration of Strategic Alternatives

We may be subject to risks associated with potential transactions related to our exploration of strategic alternatives (a "Potential Transaction"), which may not be completed on the terms or timeline contemplated, or at all, for a variety of reasons. The failure to complete a Potential Transaction could adversely affect our business, results of operations, financial condition, and the market price of our Common Stock.

We may decide to divest of certain assets or businesses as part of a Potential Transaction. For example, on June 28, 2023, we announced that we are evaluating and reviewing strategic alternatives for our U.S. business with a goal of maximizing shareholder value. Any Potential Transaction would require significant attention from our management and could result in a diversion of resources from our existing business, which in turn could have an adverse effect on our operations, and, consequently our results of operations and financial condition.

We may not be successful in identifying or managing the risks involved in any divestiture or similar transaction, including our ability to obtain a reasonable purchase price, potential liabilities that may continue to apply to us following the divestiture or similar transaction, potential tax implications, employee issues or other matters. Further, strategic opportunities are impacted by our reputation, including unfavorable publicity, and the allegations made therein, and the confidence of our business partners in our business. Our inability to address these risks could adversely affect our business, financial condition and results of operations.

Even if a Potential Transaction is initiated, there can be no assurance that all required approvals will be obtained or that all closing conditions will otherwise be satisfied (or waived, if applicable), and, if all required approvals are obtained and all closing conditions are satisfied (or waived, if applicable), we can provide no assurance as to the terms, conditions and timing of such approvals. Furthermore, if we initiate a Potential Transaction, we may be subject to a number of material risks, including:

- the trading price of our Common Stock may significantly decline to the extent that the market price of the Common Stock reflects positive market assumptions that a Potential Transaction will be initiated and completed, and the related benefits will be realized;
- the obligation to pay significant transaction costs, such as legal, accounting, and financial advisory costs that are not contingent on closing;
- disruptions to our business and our relationships with third parties and employees;
- the diversion of management and resources towards a Potential Transaction for which we will have received little or no benefit if completion of a Potential Transaction does not occur; and
- reputational harm including relationships with customers and business partners due to the adverse perception of any failure to successfully complete a Potential Transaction.

Risks Related to Nasdaq Compliance and Delisting

Our failure to timely file periodic reports with the SEC may result in the delisting of our Class A common stock.

As a result of the events described in the Explanatory Note on the first page of this Annual Report on Form 10-K, we were unable to file this Annual Report on Form 10-K for the year ended December 31, 2022, as well as our Quarterly Report on Form 10-Q for the quarters ended on March 31, 2023 and June 30, 2023 (together, the "Delayed Reports"), with the SEC on a timely basis.

By letter dated May 5, 2023, The Nasdaq Listing Qualifications Staff notified us that due to the delinquent filings as of that date, we were not in compliance with the continued listing requirement regarding the timely filing of periodic reports with the Securities and Exchange Commission (the "SEC"), and that our requests for extension had been denied. We requested and received a hearing before the Nasdaq Hearings Panel, which was held on June 22, 2023. The Nasdaq Hearings Panel issued a decision on July 6, 2023 to continue the Company's listing on The Nasdaq Stock Market ("Nasdaq"), subject to the filing of the Delayed Reports and the Quarterly Report on Form 10-Q for the quarter ended on September 30, 2022 by September 30, 2023.

On July 17, 2023, we filed the Quarterly Report on Form 10-Q for the quarter ended on September 30, 2022 with the SEC. If we are unable to file the Delayed Reports by September 30, 2023 or otherwise fail to maintain compliance with Nasdaq's listing standards, our Class A Common Stock may be delisted by Nasdaq. If our Class A common stock is delisted, it may become more difficult for our stockholders to sell our stock in the public market and the price of our Class A common stock may be adversely affected. Delisting from Nasdaq could also result in other negative outcomes, including the potential loss or reduction of confidence by customers, business partners and employees, the potential loss or reduction of investor interests, and fewer business and strategic opportunities, any of which could have a material adverse impact on our business, results of operations, and financial condition.

Risks Related to Our Technology, Business Model, and Industry

Autonomous driving is an emerging technology and involves significant risks and uncertainties.

Our autonomous driving technology is highly dependent on internally-developed software, as well as on partnerships with third parties such as semi-truck Original Equipment Manufacturers ("OEMs") and other Tier 1 suppliers. We develop and integrate our autonomous driving technology and work with OEMs and other suppliers to develop autonomous driving technology hardware.

We currently operate on our Autonomous Freight Network ("AFN") L4 autonomous semi-trucks equipped with our autonomous driving technology. We will need to establish a partnership with an OEM that seeks to manufacture purpose-built L4 autonomous semi-trucks capable of incorporating our autonomous driving technology. We also need to seek out and depend on other third parties to produce components for our L4 autonomous semi-trucks. The timely development and performance of our autonomous driving programs is dependent on the materials, cooperation, and quality delivered by partners. Further, we do not control technology for serial production, such as brakes, gear shifting, and steering. There can be no assurance that those applications can be developed and validated at the high reliability standard required for L4 autonomous driving in a cost-effective and timely manner. Our ability to establish and our dependence on these relationships expose us to the risk that components manufactured by OEMs or other suppliers could contain defects that would cause our autonomous driving technology to not operate as intended. For further information, see *"We will need to establish relationships with OEMs, business partners and other industry participants and depend on them for a substantial portion of the development and integration of our AFN. Business collaboration with partners is subject to risks, and these relationships may not lead to significant revenue. Failure to establish these relationships or any adverse change in our cooperation with them, including if they terminate or reduce the scope of their relationship with us, could have a material adverse impact on our business, financial condition, and results of operations."*

Although we believe that our algorithms, data analysis and processing, and artificial intelligence technology are promising, we cannot assure you that our technology will achieve the necessary reliability for L4 autonomy at commercial scale. For example, we are still improving our technology in terms of handling non-compliant driving behavior by other cars on the road and low reflectivity objects and performing in extreme weather conditions, such as snow or heavy fog. There can be no assurance that our data analytics and artificial intelligence can predict every single potential issue that may arise during the operation of our L4 autonomous semi-trucks. Moreover, although the initial results of our 10-week, 80,000 mile telematics study released in September 2021 and involving our L4 autonomous semi-trucks indicate that our L4 trucks reduce certain industry standard harsh driving events, there is no assurance that future results from the same study or from similar studies will yield materially similar results or that our L4 trucks will perform in a similar manner in commercial operations.

We have a limited operating history in a new market and face significant challenges as our industry is rapidly evolving.

We commenced operations in 2015 and launched in July 2020 our AFN, an ecosystem consisting of L4 autonomous semi-trucks, high definition digital mapped routes, strategically placed terminals, and TuSimple Connect, a proprietary cloud-based autonomous operations oversight system. In April 2023, we introduced our proprietary, high-performance central compute unit – the TuSimple Domain Controller.

We expect to derive the majority of our revenue from our AFN, which is still in the early stages of development and commercialization. In December 2021, we completed our first driver out, fully autonomous semi-truck run with our upfitted class 8 semi-truck traveling 80 miles on surface streets and highways at night in Arizona without a human in the vehicle. While we continue to perform driver-out runs, there is no assurance that they will be successful.

You should consider our business and prospects in light of the risks and challenges we face as a new entrant into a novel industry, including, among other things, with respect to our ability to:

- navigate an evolving and complex regulatory environment;
- resolve on favorable terms, if at all, any regulatory or government actions, inquiries, or investigations, or securities litigation;
- design, outfit, and produce safe, reliable, and quality L4 autonomous semi-trucks with our partners on an ongoing basis;
- successfully produce with OEM partners a line of purpose-built L4 autonomous semi-trucks on the timeline we estimate;
- improve and enhance our software and autonomous technology;
- establish and expand our user base;
- successfully market our products and services;
- successfully completing additional driver-out tests on open public roads on the timeline we expect, or at all;

- achieve our driver-out milestones on the timeline expected;
- demonstrate the safety profile of our L4 autonomous semi-trucks in future studies;
- properly price our products and services;
- improve and maintain our operational efficiency;
- maintain a reliable, secure, high-performance, and scalable technology infrastructure;
- attract, hire, retain, and motivate talented employees;
- anticipate and adapt to changing market conditions, including technological developments and changes in competitive landscape; and
- build a well-recognized and respected brand.

If we fail to address any or all of these risks and challenges, our business may be materially and adversely affected. There are also a number of additional challenges to L4 autonomous driving, many of which are not within our control, including market acceptance of autonomous driving, governmental licensing requirements, concerns regarding data security and privacy, actual and threatened litigation (whether or not a judgment is rendered against us), and perceptions that an autonomous vehicle is not safe because there is no human driver.

In April 2022, the Federal Motor Carrier Safety Administration initiated an investigation into an accident involving one of our trucks, which resulted in no injuries and minor damage to our vehicle. We cooperated with the investigation and it was concluded without any penalties brought against us. However, this accident resulted in negative publicity about the safety of our autonomous driving technology. There can be no assurance that the market will accept our technology, in which case our future business, results of operations and financial condition could be adversely affected.

The autonomous trucking and freight transport industry is in its early stages and is rapidly evolving. Our autonomous driving technology has not yet been commercialized. We cannot assure you that we will be able to adjust to changing market or regulatory conditions quickly or cost-effectively. If we fail to do so, our business, results of operations, and financial condition will be adversely affected.

Our business model has yet to be tested and any failure to commercialize our strategic plans would have an adverse effect on our operating results and business, harm our reputation and could result in substantial liabilities that exceed our resources.

You should be aware of the difficulties normally encountered by a relatively new enterprise that is beginning to scale its business, many of which are beyond our control, including unknown future challenges and opportunities, substantial risks and expenses in the course of entering new markets and undertaking marketing activities. The likelihood of our success must be considered in light of these risks, expenses, complications, delays, and the competitive environment in which we operate. There is, therefore, substantial uncertainty that our business plan will prove successful, and we may not be able to generate significant revenue, raise additional capital, or operate profitably. We will continue to encounter risks and difficulties frequently experienced by early commercial stage companies, including scaling up our infrastructure and headcount, and may encounter unforeseen expenses, difficulties, or delays in connection with our growth. In addition, as a result of the capital-intensive nature of our business, we can be expected to continue to sustain substantial operating expenses without generating sufficient revenue to cover expenditures.

Our future business depends in large part on our ability to continue to develop and to successfully commercialize our L4 autonomous driving technology, our AFN, and other freight capacity services we plan to offer. Our ability to develop, deliver, and commercialize our autonomous driving software and systems to support or perform autonomous operation of large semi-trucks is still unproven.

Our continued enhancement of our autonomous driving technology is and will be subject to risks, including with respect to:

- our ability to continue to enhance our data analytics and software technology;
- designing, developing, and securing necessary components on acceptable terms and in a timely manner;
- our ability to successfully complete additional driver-out pilot programs;
- our ability to attract, recruit, hire, and train skilled employees;
- any future restructuring or reduction in workforce; and
- our ability to enter into strategic relationships with key members in the trucking and freight transport industries, as well as component suppliers.

We have limited experience to date in applying our autonomous driving technology at scale. While we currently operate autonomous semi-trucks equipped with our autonomous driving technology, we have not yet produced and sold to third parties our purpose-built L4 autonomous semi-trucks. Even if we are successful in developing and commercializing our technology, we could face unexpected difficulties, delays, and cost overruns, including as a result of factors beyond our control such as unforeseen issues with our technology, problems with suppliers, and adverse regulatory developments. Any failure to develop our technology within our projected costs and timelines could have a material adverse effect on our business, prospects, operating results, and financial condition. We have not tested our semi-trucks in adverse weather conditions, including rain or snow, and the risks involved in operating in such adverse weather conditions remain uncertain.

The operation of our L4 autonomous semi-trucks is different from non-autonomous semi-trucks and may be unfamiliar to our users and other road users.

We have engineered our L4 autonomous semi-trucks with our technology, which is designed to provide the ability to sense, predict, and react to real-world driving situations. Our proprietary artificial intelligence (“AI”) and machine vision capabilities are engineered to meet the demands of commercial trucks. In certain instances, these protections may cause the vehicle to behave in ways that are unfamiliar to drivers of non-autonomous driving trucks. For example, our L4 autonomous semi-trucks are designed to adhere strictly to safety rules, including stopping for three seconds at a stop sign. These safety rules may not be strictly adhered to by human drivers, and thus may be unfamiliar or come as a surprise to other drivers on the road.

Furthermore, there can be no assurance that our users will be able to properly adapt to the different operation processes for our L4 autonomous semi-trucks. For example, users may not be able to adapt their business processes to address activities such as dispatching trucks, pre-trip inspections, remote monitoring, and truck retrieval. Any accidents resulting from such failure to operate our L4 autonomous semi-trucks properly could harm our brand and reputation, result in adverse publicity, and product liability claims, and have a material adverse effect on our business, prospects, financial condition, and operating results.

Unfavorable media coverage and publicity negatively affects our business from time to time.

Unfavorable publicity has in the past, and could in the future, adversely affect our reputation. For example, we have been the subject of media coverage regarding the safety of our technology, our senior management, including turnover of executive officers and the board of directors, litigation and regulatory or government actions, inquiries, and investigations, and we may continue to receive negative publicity related to these topics and others. Further, our business partners have raised concerns about the Company's unfavorable media coverage and the allegations made therein, which has undermined their confidence to continue doing business with us. Any such negative publicity could have a material adverse effect on our reputation, business, employee retention, prospects, ability to pursue strategic transactions or opportunities, operating results, and financial condition. We have experienced such adverse effects to varying degrees from time to time. Negative publicity also could have the effect of heightening many of the other risks described in this “Risk Factors” section.

Since the market for autonomous solutions is relatively new and disruptive, if our L4 autonomous driving technology fails to gain acceptance from users and other stakeholders in the freight transportation industry, our business, prospects, operating results, and financial condition could be materially harmed.

Demand for autonomous driving technology depends to a large extent on general, economic, political, and social conditions in a given market. The market opportunities we are pursuing are at an early stage of development, and it is difficult to predict user demand or adoption rates for our solutions, including the AFN, or the future growth of the markets in which we operate. Despite the fact that the automotive industry has engaged in considerable effort to research and test L2 and L3 autonomous cars, our technology targeting L4 autonomous semi-trucks requires significant investment and may never be commercially successful on a large scale, or at all.

Further, even if we succeed in operating at commercial scale, because of the disruptive nature of our business to the freight transportation industry, key industry participants may not accept our AFN, may develop competing services, or may otherwise seek to subvert our efforts. For example, autonomous semi-trucks might displace individual semi-truck drivers and small fleet owners. Labor unions may also raise concerns about autonomous semi-trucks displacing drivers or otherwise negatively affecting employment opportunities for their members, as has been the case in other industries that have been subject to automation. This has in the past resulted, and could in the future result, in negative publicity, lobbying efforts to U.S. local, state, and federal lawmaking authorities, or equivalent authorities in the foreign jurisdictions in which we seek to do business, to implement legislation or regulations that make it more difficult to operate our business or boycotts of us or our users. Any such occurrences could materially harm our future business.

Additionally, regulatory, safety, and reliability issues, or the perception thereof, many of which are outside of our control, could also cause the public or our potential partners and users to lose confidence in autonomous solutions in general. The safety of such technology depends in part on user interaction and users, as well as other drivers, pedestrians, other obstacles on the roadways or other unforeseen events. For example, there have been several crashes involving automobiles of other manufacturers resulting in death or personal injury where autopilot features are engaged. Even though these incidents were unrelated to our AFN and our technology, such cases resulted in significant negative publicity and, in the future, could result in suspension or prohibition of self-driving vehicles. In addition, in April 2022, the Federal Motor Carrier Safety Administration initiated an investigation into an accident involving one of our trucks, which resulted in no injuries and minor damage to our vehicle. We cooperated with the investigation and it was concluded without any penalties brought against us. However, this accident resulted in negative publicity about the safety of our autonomous driving technology. If safety and reliability issues for autonomous driving technology cannot be addressed properly, our business, prospects, operating results, and financial condition could be materially harmed.

We may be subject to product liability or warranty claims that could result in significant direct or indirect costs, including reputational harm, increased insurance premiums, or the need to self insure, which could adversely affect our business and operating results.

Our technology is used for autonomous driving, which presents the risk of significant injury, including fatalities. Product liability claims, even those without merit or those that do not involve our semi-trucks, could harm our business, prospects, financial condition, and operating results.

We may be subject to claims if one of our semi-trucks or a user's semi-truck is involved in an accident and people are injured or purport to be injured or if property is damaged. Any product liability claim may subject us to lawsuits and substantial monetary damages, product recalls, or redesign efforts, and even a meritless claim may require us to defend it, all of which may generate negative publicity and be expensive and time-consuming. Any insurance that we carry may not be sufficient or it may not apply to all situations. The risk of serious injury, death, and substantial damage to property is much higher with a substantially heavier fast-moving autonomous semi-truck, as compared to a collision with a slower moving autonomous passenger car in an urban environment.

In April 2022, the Federal Motor Carrier Safety Administration initiated an investigation into an accident involving one of our trucks, which resulted in no injuries and minor damage to our vehicle. We cooperated with the investigation, and it was concluded without any penalties brought against us. However, this accident resulted in negative publicity about the safety of our autonomous driving technology. If we cannot rapidly address any safety concerns or defects with our products or there are additional accidents involving our products, our business, our brand, relationships with users, results of operations, and financial condition will be adversely affected. If we again experience such an event or multiple events, our insurance premiums could increase significantly or insurance may not be available to us at all. Further, if insurance is not available on commercially reasonable terms, or at all, we might need to self-insure.

Furthermore, lawmakers or governmental agencies could pass laws or adopt regulations that limit the use of autonomous trucking technology or increase liability associated with its use. Additionally, product liability claims that affect our competitors or suppliers may also cause adverse publicity for us, our vehicles, and our AFN.

Our autonomous driving technology and related hardware and software could have undetected defects, errors, or bugs in hardware or software which could create safety issues, reduce market adoption, damage our reputation with current or prospective users, or expose us to product liability and other claims that could materially and adversely affect our business.

Our autonomous driving technology is highly technical and very complex, and has in the past and may in the future experience defects, errors, or bugs at various stages of development. We may be unable to timely correct problems to our partners' and users' satisfaction. Additionally, there may be undetected errors or defects especially as we introduce new systems or as new versions are released. These risks are particularly prevalent in the highly competitive freight transport market, as any such errors or defects could delay or prevent the adoption of autonomous driving technology in trucks. Errors or defects in our products may only be discovered after they have been tested, commercialized, and deployed. If that is the case, we may incur significant additional development costs and product recall, repair or replacement costs, or more importantly, liability for personal injury or property damage caused by such errors or defects, as these problems would also likely result in claims against us. Our reputation or brand may be damaged as a result of these problems and users may be reluctant to use our services, which could adversely affect our ability to retain existing users and attract new users, and could materially and adversely affect our financial results.

In addition, we could face material legal claims for breach of contract, product liability, tort or breach of warranty as a result of these problems. Any such lawsuit may cause irreparable damage to our brand and reputation. Further, defending a lawsuit, regardless of its merit, could be costly and may divert management's attention and adversely affect the market's perception of us and our services. Also, our business liability insurance coverage could prove inadequate with respect to a claim and future coverage may be unavailable on acceptable terms or at all. These product-related issues could result in claims against us and our business could be materially and adversely affected.

We operate in a highly competitive market and some market participants have substantially greater resources than we do. We compete against a large number of both established competitors and new market entrants.

The market for autonomous trucking and freight transport solutions is highly competitive. Many companies are seeking to develop autonomous trucking and delivery solutions. Competition in these markets is based primarily on technology, innovation, quality, safety, reputation, and price. Our future success will depend on our ability to further develop and protect our technology in a timely manner and to stay ahead of existing and new competitors. Our competitors in this market are working towards commercializing autonomous driving technology and may have substantial financial, marketing, research and development, and other resources.

In addition, we also face competition from traditional freight transport companies, such as non-autonomous trucking companies, railroads, and air carriers. Traditional shipping fleets and other carriers operating with human drivers are still the predominant operators in the market. Because of the long history of such traditional freight transport companies serving the freight market, there may be many constituencies in the market that would resist a shift towards autonomous freight transport, which could include lobbying and marketing campaigns, particularly because our technology will displace semi-truck drivers. Further, certain market leaders in the automotive industry may start, or have already started, pursuing large scale deployment of autonomous vehicle technology on their own. These companies may have more operational and financial resources than us. We cannot guarantee that we will be able to effectively compete with them. We may also face competition from Tier 1 suppliers and other technology and automotive supply companies if they decide to expand vertically and develop their own autonomous semi-trucks, some of whom have significantly greater resources than we do. We do not know how close these competitors are to commercializing autonomous driving systems.

Furthermore, although we believe that we have the first-mover advantage in the competitive autonomous freight segment, many established and new market participants have entered or have announced plans to enter the autonomous vehicle market. Most of these participants have significantly greater financial, manufacturing, marketing, and other resources than we do and may be able to devote greater resources to the design, development, manufacturing, distribution, promotion, sale, and support of their products. If existing competitors or new entrants are able to commercialize earlier than expected, our competitive advantage could be adversely affected.

Disruptions to the trucking industry, including changes in transportation and shipping infrastructure, could adversely impact our business, operating results, and financial condition.

Our business and financial performance are affected by the health of the truck freight industries, which are reliant on infrastructure maintained by third parties and are affected by risks that are largely out of the control of industry participants.

We or our users may experience capacity constraints due to increased demand for transportation services and decaying highway infrastructure. Poor infrastructure conditions and roadway congestion could slow service times, reduce operating efficiency and increase maintenance expense for truck operators. Some states have taken infrastructure funding measures into their own hands and have explored or instituted road-usage programs, truck-only tolling, congestion pricing, and fuel tax increases. In addition, risks including harsh weather or natural disasters, such as hurricanes, tornadoes, fires and floods, global pandemics, and acts of terrorism could further damage existing infrastructure. Damage or further deterioration of highway infrastructure could negatively impact our partners and ultimately our business and operating results by increasing costs associated with truck freight. Similarly, a failure of continued investment in highway infrastructure or a redirection of government investment into rail or ocean freight infrastructure could negatively impact the truck freight industry and ultimately us.

The trucking industry is subject to economic, business, and regulatory factors that are largely beyond our control, any of which could have a material adverse effect on us and our business.

The trucking industry is highly cyclical, and our business is dependent on a number of factors that may have a negative impact on our results of operations, many of which are beyond our control. Any conditions that negatively impact the trucking industry generally could ultimately impact demand for our technology. We believe that some of the most significant of these factors are economic changes that affect supply and demand in transportation markets such as:

- recessionary economic cycles, rising interest rates, and inflation;
- changes in the inventory levels and practices of our users, including shrinking product/package sizes, and in the availability of funding for their working capital;
- excess truck capacity in comparison with shipping demand;
- increases in fuel or equipment prices, including as a result of the conflict between Russia and Ukraine arising from the invasion of Ukraine by Russia, which may impact our users' ability to use our services or purchase our trucks;
- industry compliance with ongoing regulatory requirements; and
- downturns in business cycles of our users, including as a result of declines in consumer spending.

Additionally, economic conditions that decrease shipping demand or increase the supply of available trucks can exert downward pressure on rates and equipment utilization. The risks associated with these factors are heightened to the extent the U.S. economy is weakened. Some of the principal risks during such times are as follows:

- the trucking industry may experience low overall freight levels, which may impair demand for our technology;
- certain of our users may face credit issues and cash flow problems that may lead to payment delays, increased credit risk, bankruptcies, and other financial hardships that could result in even lower freight demand;
- freight patterns may change as supply chains are redesigned, resulting in an imbalance between the geographies where our technology is optimized to cover and those where there is demand for it; and
- our users may solicit bids for freight from multiple trucking companies or select competitors that do not use our technology in an attempt to lower their costs or due to concerns about our technology.

Our users may be subject to cost increases outside their and our control that could materially reduce demand for our technology. Such cost increases include, but are not limited to, increases in fuel prices, including as a result of the conflict between Russia and Ukraine arising from the invasion of Ukraine by Russia, rising interest rates, inflation, taxes, tolls, license and registration fees, insurance, and equipment and related maintenance, tires and other components.

Risks Related to Our Dependence on Third Parties

We rely on our relationships with OEMs, business partners, and other industry participants and depend on them for a substantial portion of the development and integration of our products and services. Business collaboration with partners is subject to risks, and these relationships may not lead to significant revenue. Any adverse change in our relationship with them, including if they terminate or reduce the scope of their relationship with us, could have a material adverse impact on our business, financial condition, and results of operations.

Strategic business relationships are and will continue to be an important factor in the growth and success of our business. Our autonomous driving technology is highly dependent on internally-developed software, as well as on partnerships with third parties such as semi-truck OEMs and other Tier 1 suppliers. We must develop and integrate our autonomous driving technology and work with OEMs and other suppliers to develop autonomous driving technology hardware. We have alliances and partnerships with other companies in the trucking and automotive industry in Asia, and we will need to identify and negotiate additional partnerships, to help us in our efforts to continue to enhance our technology, commercialize our solutions, and drive market acceptance.

We do not currently have, and therefore will need to identify and negotiate, new relationships with other third parties in the U.S., such as those who can provide service centers, maintenance, refueling, roadside service, towing, sensor support, and financing services. We may not be able to successfully identify and negotiate definitive agreements with these third parties to provide the services we would require on terms that are attractive or at all, which would cause us to incur increased costs to develop and provide these capabilities.

Collaboration with these third parties is subject to risks, some of which are outside our control. For example, on December 5, 2022, TuSimple and Navistar announced an end to our co-development under the joint development agreement dated July 2020. The reduction in scope or termination of our partnership with semi-truck manufacturers or leading microchip manufacturers has and may continue to delay or prevent our efforts to produce purpose-built L4 autonomous semi-trucks at scale and our ability to carry out our business in the ordinary course would suffer, which could have a material adverse impact on our business, results of operations, and financial condition.

In addition, such partnership agreements had in the past and may in the future contain certain exclusivity provisions which, if triggered, could preclude us from working with other businesses with superior technology or with whom we may prefer to partner for other reasons. We could experience delays to the extent our partners do not meet agreed upon timelines or experience capacity constraints. We could also experience disagreement in budget or funding for the joint development project. There is also a risk of other potential disputes with partners in the future, including with respect to intellectual property rights. Our ability to successfully commercialize could also be adversely affected by perceptions about the quality of our or our partners' trucks.

If any of our other partner agreements were to be terminated, we may be unable to enter into new agreements on terms and conditions acceptable to us. The expense and time required to complete any transition, and to assure that vehicles manufactured at facilities of new third-party partners comply with our quality standards and regulatory requirements, may be greater than anticipated. Any of the foregoing could have a material adverse impact on our business, results of operations, and financial condition.

We rely on third party suppliers and because some of the raw materials and key components in our products come from limited or sole sources of supply, we are susceptible to supply shortages, long lead times for components, and supply changes, which have disrupted and may continue to disrupt our supply chain and could delay deliveries of our products to users.

All of the components that are used to outfit semi-trucks with our autonomous technology and that will be used to manufacture our purpose-built L4 autonomous semi-trucks are sourced from third-party suppliers. To date, the semi-trucks we have used had our autonomous technology added to an existing semi-truck design. We do not have any experience in managing a large supply chain to manufacture and deliver products at scale.

In addition, some of the key components used to manufacture our L4 autonomous semi-trucks come from limited or sole sources of supply. For example, we depend on actuation suppliers to develop and design redundant actuation for steering, braking, and engine transmission. We are also dependent on our suppliers' production timeline for supplying automotive-grade LiDAR at scale. We are, therefore, subject to the risk of shortages and long lead times in the supply of these components and the risk that our suppliers discontinue or modify components used in our products. Any delay in the manufacture, launch, and financing of our purpose-built L4 autonomous semi-trucks could materially damage our brand, business, prospects, financial condition, and operating results. To the extent we delay the launch of our purpose-built L4 autonomous semi-trucks, our growth prospects could be adversely affected.

Furthermore, our agreements with our third party suppliers are non-exclusive. Our suppliers may dedicate more resources to other companies, including our competitors. We have already and may in the future experience component shortages and price fluctuations of certain key components and materials, and the predictability of the availability and pricing of these components may be limited. Current or future supply chain interruptions that could be exacerbated by global political tensions, such as the situation in Ukraine, could negatively impact our ability to acquire such key components or materials. Component shortages or pricing fluctuations could be material in the future. In the event of a component shortage, supply interruption, or material pricing change from suppliers of these components, we may not be able to develop alternate sources in a timely manner or at all in the case of sole or limited sources. Developing alternate sources of supply for these components may be time-consuming, difficult, and costly and we may not be able to source these components on terms that are acceptable to us, or at all, which may undermine our ability to meet our requirements or to fill user orders in a timely manner. Any interruption or delay in the supply of any of these parts or components, or the inability to obtain these parts or components from alternate sources at acceptable prices and within a reasonable amount of time, may adversely affect our ability to meet scheduled product deliveries to users. This could adversely affect our relationships with our users and could cause delays in our ability to expand our operations, including with our partners manufacturing purpose-built L4 autonomous semi-trucks. Even where we are able to pass increased component costs along to our users, there may be a lapse of time before we are able to do so such that we must absorb the increased cost initially. If we are unable to buy these components in quantities sufficient to meet our requirements on a timely basis, we will not be able to have sufficient ability to meet user demand, which may result in users using competitive services instead of ours.

Risks Related to Our Financial Position and Need for Additional Capital

We are an early stage company, with a history of losses, and expect to incur significant expenses and continuing losses for the foreseeable future.

We have not recognized a material amount of revenue to date and had an accumulated deficit of \$1.6 billion as of December 31, 2022. We have developed and launched our products and services but there can be no assurance that it will be commercially successful at scale. Our potential profitability is dependent upon a number of factors, many of which are beyond our control.

We expect to incur significant losses in future periods as we:

- design, develop, and manufacture purpose-built L4 autonomous semi-trucks with our OEM partners;
- seek to achieve and commercialize full L4 autonomy for our purpose-built L4 autonomous semi-trucks;
- seek to expand our AFN;
- expand our design, development, maintenance, and repair capabilities;
- respond to competition in the autonomous driving market and from traditional freight transportation providers;
- respond to evolving regulatory developments, litigation, government actions, inquiries, and investigations in the nascent autonomous vehicle market;
- increase our sales and marketing activities; and
- manage our headcount to accelerate our product launches and scale our network.

Because we will incur the costs and expenses from these efforts before we receive any incremental revenue, we expect that our losses in future periods will be significant. In addition, we may find that these efforts are more expensive than we currently anticipated or that these efforts may not result in revenue, which would further increase our losses. In particular, we expect to incur substantial research and development (“R&D”) costs. Because we account for R&D as an operating expense, these expenditures will adversely affect our results from operations in the future. Further, our R&D program may not produce successful results, and our new products may not achieve market acceptance, create additional revenue, or become profitable.

We expect to need to raise additional funds and these funds may not be available to us on attractive terms when we need them, or at all. If we cannot raise additional funds on attractive terms when we need them, our operations and prospects could be negatively affected.

The commercialization of L4 autonomous semi-trucks outfitted with our technology, purpose-built L4 autonomous semi-trucks manufactured by our OEM partners and our AFN and related technology is capital-intensive. To date, we have financed our operations primarily through the issuance of equity securities and convertible debt securities. We will need to raise additional capital to continue to fund our research and development and commercialization activities and to improve our liquidity position. Our ability to obtain the necessary financing to carry out our business plan is subject to a number of factors, including general market volatility, investor acceptance of our business plan, regulatory requirements, including foreign investment reviews, and the successful development of our autonomous technology. These factors may make the timing, amount, terms, and conditions of such financing unattractive or unavailable to us.

We may raise these additional funds through the issuance of equity, equity-related, or debt securities. To the extent that we raise additional financing by issuing equity securities or convertible debt securities, our stockholders may experience substantial dilution, and to the extent we engage in debt financing, we may become subject to restrictive covenants that could limit our flexibility in conducting future business activities. Financial institutions may request credit enhancements such as third-party guarantees and pledges of equity interests in order to extend loans to us. We cannot be certain that additional funds will be available to us on attractive terms when required, or at all. Further, unfavorable publicity and the allegations made therein, the turnover of our Board and senior management, our reputation, and the willingness of business partners to continue doing business with us may have a negative impact on the terms of any necessary financing, if available. If we cannot raise additional funds when we need them, our financial condition, results of operations, business, and prospects could be materially adversely affected.

Risks Related to Our Business Operations

We depend on the experience and expertise of our senior management team, engineers, and employees. Our inability to recruit and retain executive officers, engineers, and qualified employees could harm our business, operating results, and financial condition.

Our success depends largely upon the continued services of our executive officers, engineers, and employees. We rely on our executive officers and qualified employees in the areas of business strategy, research and development, marketing, sales, services, and general and administrative functions. We have experienced several senior management changes, including multiple C-suite executives during 2022, and there may continue to be changes in our executive management team or key employees resulting from the hiring or departure of executives or key employees, which could disrupt our business. In addition, we have experienced, and we expect to continue to experience, difficulty in retaining employees with appropriate qualifications.

For example, as previously disclosed, on December 15, 2022, the Board authorized a broad restructuring plan to rebalance our cost structure in alignment with its strategic priorities, including the reduction in workforce by approximately 350 employees, or 25% of our global workforce. On May 16, 2023, the Board authorized an additional restructuring plan to further align our cost structure with its strategic priorities, including a reduction in workforce by approximately 300 employees, or 30% of our global workforce. There can be no assurance regarding future restructuring plans or reductions in workforce, which could individually or in the aggregate, have a material adverse impact on our business, results of operations and financial condition. Additionally, following the announcement of our reductions in force and the exploration of strategic alternatives for our U.S. business, we have experienced, and may continue to experience, significant employee attrition.

Furthermore, changes to our Board and senior management, unfavorable publicity, or perceptions about our succession planning could adversely impact our ability to attract and retain qualified personnel. We do not maintain key-person insurance for any member of our senior management team or any other employee. We do not have employment agreements with our executive officers or other key personnel that require them to continue to work for us for any specified period and, therefore, they could terminate their employment with us at any time. The loss of one or more of our executive officers, engineers, or qualified employees could have an adverse effect on our business.

Our workforce was recently reduced, which, along with our exploration of strategic alternatives and other additional factors, could impact the speed of our business development and our ability to retain and attract talent.

As disclosed above, on December 15, 2022 and May 16, 2023, the Board authorized restructuring plans, which included reductions in workforce. There can be no assurance regarding future restructuring plans or reductions in workforce, which could individually or in the aggregate, have a material adverse impact on our business, results of operations, and financial condition, and our ability to hire and retain employees with appropriate qualifications.

We have experienced, and we expect to continue to experience, difficulty in hiring and retaining employees with appropriate qualifications. The restructuring plans mentioned above, the announcement of our exploration of strategic alternatives, and other factors mentioned throughout this Form 10-K have contributed to significant employee attrition.

To execute our strategy, our business requires that we attract and retain highly qualified personnel. Competition for these personnel is intense in the technology industry, especially for engineers with high levels of experience in artificial intelligence and designing and developing autonomous driving related algorithms. We may also need to recruit highly qualified technical engineers internationally and therefore subject us to the compliance of relevant immigration laws and regulations. Many of the companies with which we compete for experienced personnel have greater resources than we have and can offer more attractive compensation packages for new employees.

Additionally, if we hire employees from competitors or other companies, their former employers may attempt to assert that these employees or our company have breached their legal obligations, resulting in a diversion of our time and resources and potentially in litigation. Further, job candidates and existing employees often consider the value of the equity awards they receive in connection with their employment. If the perceived value of our equity awards declines, it may adversely affect our ability to recruit and retain highly skilled employees. If we fail to attract new personnel on a timely basis or fail to retain and motivate our current personnel, we may not be able to commercialize and then expand our products and services in a timely manner and our business and future growth prospects could be adversely affected.

Our management team has limited experience managing a public company.

Most of the members of our management team have limited experience managing a publicly-traded company, interacting with public company investors, and complying with the increasingly complex laws pertaining to public companies. Our management team may not successfully or efficiently manage our public company reporting obligations under the federal securities laws and the continuous scrutiny of securities analysts and investors. These new obligations and constituents have required and will continue to require significant attention from our senior management and could divert their attention away from the day-to-day management of our business, which could adversely affect our business, financial condition, and operating results.

If we fail to manage our growth effectively, we may be unable to execute our business plan, maintain high levels of service, or adequately address competitive challenges.

Although we recently announced restructuring plans, we plan to continue to expand our international operations in the future, which may place a significant strain on our managerial, administrative, operational, and financial resources, as well as our infrastructure. Our success will depend in part on our ability to manage this growth effectively and execute our business plan. To manage the expected growth of our operations and personnel, we will need to continue to improve our operational, financial, and management controls and our reporting systems and procedures.

We rely heavily on information technology (“IT”) systems to manage critical business functions. To manage our business effectively, we must continue to improve and update our infrastructure, including our IT, financial, human resources, and administrative systems and controls. In particular, we may need to significantly expand our IT infrastructure as the amount of data we store and transmit increases over time, which will require that we both utilize existing IT products and adopt new technology. If we are not able to scale our IT infrastructure in a cost-effective and secure manner, our ability to offer competitive solutions will be harmed and our business, financial condition, and operating results may suffer.

We must also continue to manage our employees, operations, finances, research and development, and capital investments efficiently. Our productivity and the quality of our solutions may be adversely affected if we do not integrate and train our new employees quickly and effectively or if we fail to appropriately coordinate across our executive, research and development, technology, service development, analytics, finance, human resources, marketing, sales, operations, and customer support teams. As we continue to grow, we will incur additional expenses, and our growth may continue to place a strain on our resources, infrastructure, and ability to maintain the quality of our solutions. If we do not adapt to meet these evolving challenges, or if the current and future members of our management team do not effectively manage our growth, the quality of our solutions may suffer and our corporate culture may be harmed.

Our L4 autonomous semi-trucks are expensive and, as a result, we, along with our users, may need to obtain financing to purchase or lease semi-trucks.

Because acquiring semi-trucks and then outfitting them with our autonomous technology is expensive, we will need to obtain committed financing capacity for our self-operated fleet to support our growth, and we may in the future be required to find financing solutions to help our users or us purchase or finance our purpose-built L4 autonomous semi-trucks manufactured in partnership with OEMs. Our ability to attract financing depends on many factors that are outside of our control, including our or our users’ perceived creditworthiness and the condition of credit markets generally, including fluctuation in interest rates. If we are unable to procure financing partners willing to finance such deployments on terms favorable to us or at all, our ability to grow our business may be harmed.

We will be required to make significant capital expenditures to maintain our fleet of L4 autonomous semi-trucks.

We expect our capital expenditure requirements will primarily relate to maintaining and upgrading our fleet of L4 autonomous semi-trucks to serve our users and remain competitive. The aging of our fleet will require us to make regular capital expenditures to maintain our level of service. In addition, changing competitive conditions or the emergence of any significant advances in autonomous driving technology could require us to invest significant capital in additional equipment or capacity in order to remain competitive. If we are unable to fund any such investment or otherwise fail to invest in new vehicles, our business, financial condition, or results of operations could be materially and adversely affected.

If our L4 autonomous semi-trucks fail to perform as expected, our ability to develop our AFN and market, sell, or lease our purpose-built L4 autonomous semi-trucks could be harmed. Future product recalls involving our purpose-built L4 autonomous semi-trucks or hardware deployed on our L4 autonomous semi-trucks could materially and adversely affect our business, prospects, operating results, and financial condition.

Our L4 autonomous semi-trucks and, once production begins, our purpose-built L4 autonomous semi-trucks may contain defects in design and manufacture that may cause them not to perform as expected or may require repair. For example, our L4 autonomous semi-trucks currently use, and our purpose-built L4 autonomous semi-trucks are expected to use, a substantial amount of software to operate which will require modification and updates over the life of the vehicle. Software products are inherently complex and often contain defects and errors when first introduced. There can be no assurance that we will be able to detect and fix any defects in the semi-trucks' hardware or software prior to commencing user sales or during the life of the trucks. Our purpose-built L4 autonomous semi-trucks may not perform consistent with users' expectations or consistent with other trucks that may become available. Any product defects or any other failure of our purpose-built L4 autonomous semi-trucks to perform as expected could harm our reputation and ability to develop our products and services and result in adverse publicity, lost revenue, delivery delays, product recalls, product liability claims, and significant warranty and other expenses, and could have a material adverse impact on our business, financial condition, operating results, and prospects.

Once production begins, we may experience recalls involving our purpose-built L4 autonomous semi-trucks, which could adversely affect our brand in our target markets and could adversely affect our business, prospects, and results of operations. Any product recall in the future may result in adverse publicity, damage our brand, and materially adversely affect our business, prospects, operating results, and financial condition. In the future, we may voluntarily or involuntarily, initiate a recall if any of our purpose-built L4 autonomous semi-truck components (including LiDAR sensors, cameras, and other components) prove to be defective or noncompliant with applicable motor vehicle safety standards. Such recalls typically involve significant expense and diversion of management attention and other resources, which could adversely affect our brand image, as well as our business, prospects, financial condition, and results of operations.

If we are unable to establish and maintain confidence in our long-term business prospects among users, securities and industry analysts, and within our industries, or are subject to negative publicity, then our financial condition, operating results, business prospects, and access to capital may suffer materially.

Users may be less likely to purchase or use our L4 autonomous semi-trucks if they are not convinced that our business will succeed or that our service and support and other operations will continue in the long term. Similarly, suppliers and other third parties will be less likely to invest time and resources in developing business relationships with us if they are not convinced that our business will succeed. Accordingly, in order to build and maintain our business, we must maintain confidence among users, suppliers, securities and industry analysts, and other parties in our long-term financial viability and business prospects. Negative publicity, including with respect to the subject matter of the previously disclosed Audit Committee investigation, and changes to our Board and senior management are additional factors that can contribute to a loss of confidence in our business. Maintaining such confidence may be particularly complicated by certain factors, including those that are largely outside of our control, such as our limited operating history at scale, user unfamiliarity with our solutions, any delays in scaling manufacturing, delivery, and service operations to meet demand, competition, and uncertainty regarding the future of autonomous vehicles, and our performance compared with market expectations.

We have identified and may in the future identify material weaknesses in our internal control over financial reporting.

We have identified control deficiencies in the design and implementation of our internal control over financial reporting that constituted material weaknesses. For example, and as previously disclosed, based on our Audit Committee's investigation, we believe that, during 2022, in connection with our evaluation of Hydron Inc. ("Hydron") as a potential OEM partner, we shared confidential information with Hydron and its partners, which was not brought to the attention of the Audit Committee and Government Security Committee, and before entering into relevant non-disclosure and other cooperation agreements. After the information was disclosed, we entered into a non-disclosure agreement with Hydron that covered the information. We do not know whether Hydron shared, or publicly disclosed, the information before entering into that agreement. We believe, based on the Audit Committee's investigation, that the information shared was not source code, was not the confidential information of our partners or suppliers and was consistent with information we normally shares with our vendors. At this time, we have not been able to determine the value, if any, of such information. Sharing such confidential information with Hydron prior to us entering into a non-disclosure agreement may result in a material adverse impact to our business, financial condition, and results of operations. Sharing such confidential information with Hydron could also impact our long-term business prospects among users, securities and industry analysts, and within our industries.

The Company has a policy requiring that related party transactions, or any transaction that may involve an actual or potential conflict of interest, be reported, reviewed, and approved by the Audit Committee. We believe this control failure was the result of a lack of understanding among our personnel regarding the scope and application of the policy. The Audit Committee's investigation has concluded in part that a related party transaction occurred between the Company and Hydron and such transaction was not properly reviewed, approved, or disclosed in accordance with the Company's policy. Additionally, the unexpected removal of all of our independent directors and the dissolution of our Audit Committee in November 2022 by our controlling shareholders impacted the oversight and monitoring of required internal controls and procedures as of December 31, 2022. Based upon the above findings, management has concluded that material weaknesses exist in its internal control over financial reporting.

A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our financial statements will not be prevented or detected on a timely basis. Any failure to implement and maintain effective internal control over financial reporting could adversely affect the results of the period including management evaluations and annual independent registered public accounting firm attestation reports regarding the effectiveness of our internal control over financial reporting that we will eventually be required to include in our periodic reports that are filed with the SEC. Ineffective disclosure controls and procedures and internal control over financial reporting could also cause investors to lose confidence in our reported financial and other information, which would likely have a negative effect on the trading price of our Class A common stock. In addition, if we are unable to continue to meet these requirements, we may not be able to remain listed on the Nasdaq Global Select Market.

We are continuing to remediate the deficiencies described above, as described in Item 9A of Part II of this Annual Report on Form 10-K, and intend to take such other action as we deem appropriate to further strengthen our internal control over financial reporting. However, because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Additionally, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. In the future, we may identify additional material weaknesses that may cause us to fail to meet our reporting obligations or result in material misstatements of our financial statements. If we fail to remediate such material weaknesses or if we otherwise fail to establish and maintain effective control over financial reporting, our ability to accurately and timely report our financial results could be adversely affected. Finally, these material weaknesses may also have the effect of heightening many of the other risks described in this "Risk Factors" section.

Pandemics and epidemics, including the COVID-19 pandemic, natural disasters, terrorist activities, political unrest, and other outbreaks could have a material adverse impact on our business, results of operations, financial condition, cash flows or liquidity, and the extent to which we will be impacted will depend on future developments, which cannot be predicted.

We are vulnerable to pandemics, natural disasters and other calamities. Although we have servers that are hosted in an offsite location, our backup system does not capture data on a real-time basis and we may be unable to recover certain data in the event of a server failure. We cannot assure you that any backup systems will be adequate to protect us from the effects of fire, floods, typhoons, earthquakes, power loss, telecommunications failures, break-ins, war or other military conflict, including an escalation of the conflict between Russia and Ukraine, riots, terrorist attacks, or similar events. Any of the foregoing events may give rise to interruptions, breakdowns, system failures, technology platform failures, or internet failures, which could cause the loss or corruption of data or malfunctions of software or hardware as well as adversely affect our ability to provide services.

Risks Related to Our Intellectual Property, Information Technology, and Data Privacy

Our business has been and may continue to be adversely affected if we are unable to adequately establish, maintain, protect, and enforce our intellectual property and proprietary rights or prevent third parties from making unauthorized use of our technology and other intellectual property rights.

Our intellectual property is an essential asset of our business. Failure to adequately protect our intellectual property rights could result in our competitors offering similar products, potentially resulting in the loss of our competitive advantage, and a decrease in our revenue, which would adversely affect our business prospects, financial condition, and operating results. Our success depends, at least in part, on our ability to protect our core technology and intellectual property. We rely on a combination of intellectual property rights, such as patents, trademarks, copyrights, and trade secrets (including know-how), in addition to employee and third-party nondisclosure agreements, intellectual property licenses, and other contractual rights, to establish, maintain, protect, and enforce our rights in our technology, proprietary information, and processes. Intellectual property laws and our procedures and restrictions provide only limited protection and any of our intellectual property rights may be challenged, invalidated, circumvented, infringed or misappropriated. If we fail to protect our intellectual property rights adequately, we may lose an important advantage in the markets in which we compete.

We have received letters from third parties that identify patents owned by third parties and invite us to obtain licenses to such patents. We work with patent counsel to evaluate the merits of their claims and sometimes we may decide to engage in licensing discussions. We may not be able to obtain a commercially reasonable license or a license that we obtain (if any) may not entirely resolve the potential risks of intellectual property infringement. As we face increasing competition and as a public company, the possibility of intellectual property rights claims against us grows.

There may be intellectual property rights held by others, including issued or pending patents and trademarks, that cover significant aspects of our technologies or business methods, and we cannot assure that we are not infringing or violating, and have not infringed or violated, any third-party intellectual property rights or that we will not be held to have done so or be accused of doing so in the future. In addition, because patent applications can take many years until the patents issue, there may be applications now pending of which we are unaware, which may later result in issued patents that our products may infringe. We expect that in the future we may receive notices that claim we or our collaborators have misappropriated or misused other parties' intellectual property rights, particularly as the number of competitors in our market grows.

While we take measures to protect our intellectual property, such efforts may be insufficient or ineffective, and any of our intellectual property rights may be challenged, which could result in them being narrowed in scope or declared invalid or unenforceable. Other parties may also independently develop technologies that are substantially similar or superior to ours. We also may be forced to bring claims against third parties, or defend claims that they may bring against us, to determine the ownership of what we regard as our intellectual property. To defend ourselves against any intellectual property claims brought by third parties, whether with or without merit, can be time-consuming and could result in substantial costs and a diversion of our resources. These claims and any resulting lawsuits, if resolved adversely to us, could subject us to significant liability for damages, impose temporary or permanent injunctions against our products, technologies, or business operations, invalidate or render unenforceable our intellectual property, delay the introduction and implementation of new technologies, result in our substituting inferior or more costly technologies into our products or injure our reputation.

However, the measures we take to protect our intellectual property from unauthorized use by others may not be effective and there can be no assurance that our intellectual property rights will be sufficient to protect against others offering products, services, or technologies that are substantially similar or superior to ours and that compete with our business.

We also may not be successful in any attempt to redesign our technology to avoid any alleged infringement. A successful claim of infringement against us, or our failure or inability to develop and implement non-infringing technology, or license the infringed technology on acceptable terms and on a timely basis, could materially adversely affect our business and results of operations. Furthermore, such lawsuits, regardless of their success, would likely be time-consuming and expensive to resolve and would divert management's time and attention from our business, which could seriously harm our business. Also, such lawsuits, regardless of their success, could seriously harm our reputation with users and in the industry at large.

Moreover, policing unauthorized use of our technologies, trade secrets, and intellectual property may be difficult, expensive, and time-consuming, particularly in foreign countries where the laws may not be as protective of intellectual property rights as those in the United States and where mechanisms for enforcement of intellectual property rights may be weak.

Additionally, see above "*We have identified and may in the future identify material weaknesses in our internal control over financial reporting*" section under this Item 1A, *Risk Factors*.

Changes in U.S. patent law could diminish the value of patents in general, thereby impairing our ability to protect our products.

There are a number of recent changes to the patent laws that may have a significant impact on our ability to protect our technology and enforce our intellectual property rights.

Further, the standards applied by the USPTO and foreign patent offices in granting patents are not always applied uniformly or predictably. For example, there is no uniform worldwide policy regarding patentable subject matter or the scope of claims allowable for business methods. As such, we do not know the degree of future protection that we will have on our technologies, products, and services. While we will endeavor to try to protect our technologies, products, and services with intellectual property rights such as patents, as appropriate, the process of obtaining patents is time-consuming, expensive, and sometimes unpredictable.

Additionally, the U.S. Supreme Court has ruled on several patent cases in recent years, such as *Impression Products, Inc. v. Lexmark International, Inc.*, *Association for Molecular Pathology v. Myriad Genetics, Inc.*, *Mayo Collaborative Services v. Prometheus Laboratories, Inc.* and *Alice Corporation Pty. Ltd. v. CLS Bank International*, either narrowing the scope of patent protection available in certain circumstances or weakening the rights of patent owners in certain situations. In addition to increasing uncertainty with regard to our ability to obtain patents in the future, this combination of events has created uncertainty with respect to the value of patents, once obtained. Depending on decisions by the U.S. Congress, the federal courts, and the USPTO, the laws and regulations governing patents could change in unpredictable ways that could weaken our ability to obtain new patents or to enforce our existing patents and patents that we might obtain in the future.

Our patent applications may not be issued as patents, which may have a material adverse effect on our ability to prevent others from commercially exploiting products similar to ours.

We cannot be certain that we are the first inventor of the subject matter to which we have filed a particular patent application, or if we are the first party to file such a patent application. If another party has filed a patent application covering the same subject matter as we have, we may not be entitled to the protection sought by the patent application. Further, the scope of protection of issued patent claims is often difficult to determine. As a result, we cannot be certain that the patent applications that we file will issue, or that our issued patents will be broad enough to protect our proprietary rights or otherwise afford protection against competitors with similar technology. In addition, the issuance of a patent is not conclusive as to its inventorship, scope, validity, or enforceability. Our competitors may challenge or seek to invalidate our issued patents, or design around our issued patents, which may adversely affect our business, prospects, financial condition, or operating results. Also, the costs associated with enforcing patents, confidentiality and invention agreements, or other intellectual property rights may make aggressive enforcement impracticable.

In addition to patented technology, we rely on our unpatented proprietary technology, trade secrets, processes, and know-how.

We rely on proprietary information (such as trade secrets, know-how, and confidential information) to protect intellectual property that may not be patentable, or that we believe is best protected by means that do not require public disclosure. We generally seek to protect this proprietary information by entering into confidentiality agreements, or consulting, services, or employment agreements that contain non-disclosure and non-use provisions with our employees, consultants, contractors, scientific advisors, and third parties. However, we cannot guarantee that we have entered into such agreements with each party that has or may have had access to our trade secrets or proprietary information and, even if entered into, these agreements may be breached or may otherwise fail to prevent disclosure, third-party infringement, or misappropriation of our proprietary information, may be limited as to their term and may not provide an adequate remedy in the event of unauthorized disclosure or use of proprietary information.

Additionally, see above “*We have identified and may in the future identify material weaknesses in our internal control over financial reporting*” section under this Item 1A, *Risk Factors*.

Our third-party manufacturers and suppliers have access to our protected intellectual property, which may have a material adverse effect on our ability to protect our trade secrets and prevent others from commercially exploiting products similar to ours.

We have limited control over the protection of trade secrets used by our third-party manufacturers and suppliers and could lose future trade secret protection if any unauthorized disclosure of such information occurs. In addition, our proprietary information may otherwise become known or be independently developed by our competitors or other third parties. To the extent that our employees, consultants, contractors, and other third parties use intellectual property owned by others in their work for us, disputes may arise as to the rights in related or resulting know-how and inventions. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain protection for our proprietary information could adversely affect our competitive business position. Furthermore, laws regarding trade secret rights in certain markets where we operate may afford little or no protection to our trade secrets. If any of our trade secrets were to be lawfully obtained or independently developed by a competitor or other third party, we would have no right to prevent them from using that trade secret to compete with us. If any of our trade secrets were to be disclosed (whether lawfully or otherwise) to or independently developed by a competitor or other third party, it could have a material adverse effect on our business, operating results, and financial condition.

We also rely on physical and electronic security measures to protect our proprietary information, but we cannot guarantee that these security measures provide adequate protection for such proprietary information or will never be breached. There is a risk that third parties may obtain unauthorized access to and improperly utilize or disclose our proprietary information, which would harm our competitive advantages. We may not be able to detect or prevent the unauthorized access to or use of our information by third parties, and we may not be able to take appropriate and timely steps to mitigate the damages (or the damages may not be capable of being mitigated or remedied).

We utilize open-source software, which may pose particular risks to our proprietary software, technologies, products, and services in a manner that could harm our business.

We use open source software in our products and services and anticipate using open source software in the future. Some open source software licenses require those who distribute open source software as part of their own software products to publicly disclose all or part of the source code to such software product or to make available any modifications or derivative works of the open source code on unfavorable terms or at no cost. This could result in our proprietary software being made available in the source code form and/or licensed to others under open source licenses, which could allow our competitors or other third parties to use our proprietary software freely without spending the development effort, and which could lead to a loss of the competitive advantage of our proprietary technologies and, as a result, sales of our products and services. The terms of many open source licenses to which we are subject have not been interpreted by U.S. or foreign courts, and there is a risk that open source software licenses could be construed in a manner that imposes unanticipated conditions or restrictions on our ability to provide or distribute our products or services or retain our ownership of our proprietary intellectual property. Additionally, we could face claims from third parties claiming ownership of, or demanding release of, the open source software or derivative works that we developed using such software, which could include our proprietary source code, or otherwise seeking to enforce the terms of, or alleging breach of, the applicable open source license. These claims could result in litigation and could require us to make our proprietary software source code freely available, purchase a costly license, or cease offering the implicated products or services unless and until we can re-engineer them to avoid breach of the applicable open source software licenses or potential infringement. This re-engineering process could require us to expend significant additional research and development resources, and we cannot guarantee that we will be successful.

Additionally, the use of certain open source software can lead to greater risks than use of third-party commercial software, as open source licensors generally do not provide warranties or controls on the origin of software. There is typically no support available for open source software, and we cannot ensure that the authors of such open source software will implement or push updates to address security risks or will not abandon further development and maintenance. Many of the risks associated with the use of open source software, such as the lack of warranties or assurances of title, non-infringement, or performance, cannot be eliminated, and could, if not properly addressed, negatively affect our business. We have processes to help alleviate these risks, including a review process for screening requests from our developers for the use of open source software, but we cannot be sure that all open source software is identified or submitted for approval prior to use in our products and services. Any of these risks could be difficult to eliminate or manage, and, if not addressed, could adversely affect our ownership of proprietary intellectual property, the security of our vehicles, or our business, results of operations, and financial condition.

If our software contains serious errors or defects, we may lose revenue and market acceptance and may incur costs to defend or settle claims with our licensees, franchisees, or other parties.

Software inevitably contains errors, defects, security vulnerabilities, or software bugs, some of which are difficult to detect and correct, particularly when first introduced or when new versions or enhancements are released. Despite internal testing, our software may contain serious errors or defects, security vulnerabilities, or software bugs that we may be unable to successfully detect or correct in a timely manner or at all, which could result in security incidents, data breaches, vehicle safety issues, product liability claims, lost revenue, significant expenditures of capital, a delay or loss in market acceptance, and damage to our reputation and brand, any of which could adversely affect our business, results of operations, and financial condition.

We are exposed to, and may be adversely affected by, interruptions to our information technology systems and networks and sophisticated cyber-attacks.

We collect and maintain information in digital form that is necessary to conduct our business, and we rely on information technology systems and networks (“IT systems”) in connection with many of our business activities. Some of these networks and systems are managed by third-party service providers and are not under our direct control, and as a result, a number of third-party service providers may or could have access to our confidential information. Our operations routinely involve receiving, storing, processing, and transmitting confidential or sensitive information pertaining to our business, users, dealers, suppliers, employees, and other sensitive matters, including intellectual property, proprietary business information, and personal information. It is critical that we do so in a secure manner to maintain the confidentiality and integrity of such confidential or sensitive information. We have established physical, electronic, and organizational measures designed to safeguard and secure our systems to prevent a data compromise, and rely on commercially available systems, software, tools, and monitoring to provide security for our IT systems and the processing, transmission, and storage of digital information. Despite the implementation of preventative and detective security controls, such IT systems are vulnerable to damage or interruption from a variety of sources, including telecommunications or network failures or interruptions, system malfunction, natural disasters, malicious human acts, terrorism, and war. Such IT systems, including our servers, are additionally vulnerable to physical or electronic break-ins, security breaches from inadvertent or intentional actions by our employees, third-party service providers, contractors, consultants, business partners, and/or other third parties, or from cyber-attacks by malicious third parties (including the deployment of harmful malware, ransomware, denial-of-service attacks, social engineering, and other means to affect service reliability and threaten the confidentiality, integrity, and availability of information).

We have experienced data breaches, cyber-attacks, attempts to breach our systems, and other similar incidents, none of which have been material. Any future cyber incidents could, however, materially disrupt operational systems, result in the loss of trade secrets or other proprietary or competitively sensitive information, compromise personally identifiable information regarding users or employees, and jeopardize the security of our facilities, among other things. The risk of a security breach or disruption, particularly through cyber-attacks or cyber intrusion, including by computer hackers, foreign governments, and cyber terrorists, has generally increased as the number, intensity, and sophistication of attempted attacks and intrusions from around the world have increased. Due to the political uncertainty involving Russia and Ukraine, there is also an increased likelihood that escalation of tensions could result in cyber-attacks or cybersecurity incidents that could either directly or indirectly impact our operations. We can provide no assurance that our current IT systems, or those of the third parties upon which we rely, are fully protected against cybersecurity threats. It is possible that we or our third-party service providers may experience cybersecurity and other breach incidents that remain undetected for an extended period. Even when a security breach is detected, the full extent of the breach may not be determined immediately. Because techniques used to obtain unauthorized access or to sabotage systems change frequently and generally are not recognized until they are launched against a target, we may be unable to anticipate these techniques or to implement adequate preventative measures. Information technology security threats, including security breaches, computer malware, and other cyber-attacks are increasing in both frequency and sophistication and could cause us to incur financial liability, subject us to legal or regulatory sanctions or damage our reputation with users, dealers, suppliers, and other stakeholders. We continuously seek to maintain information security and controls, however our efforts to mitigate and address network security problems, bugs, viruses, worms, malicious software programs, and security vulnerabilities may not be successful and the impact of a material cybersecurity event could have a material adverse effect on our competitive position, reputation, results of operations, financial condition, and cash flows.

Unauthorized control or manipulation of systems in autonomous semi-trucks may cause them to operate improperly or not at all, or compromise their safety and data security, which could result in loss of confidence in us and our products, termination of contracts with certain of our OEM or Tier 1 partners and harm our business.

There have been reports of vehicles of certain OEMs being “hacked” to grant access to and operation of such vehicles to unauthorized persons. Our L4 autonomous semi-trucks contain complex IT systems and are designed with built-in data connectivity. We have designed, implemented, and tested security measures intended to prevent unauthorized access to our information technology networks and systems installed in our L4 autonomous semi-trucks. However, hackers may attempt to gain unauthorized access to modify, alter, and use such networks and systems to gain control of, or to change, our semi-trucks’ functionality, user interface, and performance characteristics, or to gain access to data stored in or generated by our products. As techniques used to obtain unauthorized access to or sabotage systems change frequently and may not be known until launched against us or our third-party service providers, there can be no assurance that we will be able to anticipate, or implement adequate measures to protect against, these attacks. Any such security incidents could result in unexpected control of or changes to the vehicles’ functionality and safe operation and could result in legal claims or proceedings and negative publicity, which would negatively affect our brand and harm our business, prospects, financial condition, and operating results.

We are subject to a variety of U.S. and international data privacy and consumer protection laws. The costs to comply with, or our actual or perceived failure to comply with, changing U.S. and foreign laws related to data privacy, security, and protection, or contractual obligations related to data privacy, security, and protection, could adversely affect our financial condition, operating results, and our reputation.

Any failure by us, our vendors, or business partners to comply with federal, state, or international privacy, data protection or security laws or regulations relating to the processing, collection, use, retention, security and transfer of personally identifiable information could result in regulatory or litigation-related actions against us, legal liability, fines, damages, ongoing audit requirements, and other significant costs. Substantial expenses and operational changes may be required in connection with maintaining compliance with such laws, and even an unsuccessful challenge by customers or regulatory authorities of our activities could result in adverse publicity and could require a costly response from and defense by us. Risks and penalties could include ongoing audit requirements, data protection authority investigations, legal proceedings by domestic and international governmental entities, or others resulting in mandated disclosure of sensitive data or other commercially unfavorable terms.

In addition, certain emerging privacy laws are still subject to a high degree of uncertainty as to their interpretation, application, and impact, and may require extensive system and operational changes, be difficult to implement, increase our operating costs, adversely impact the cost or attractiveness of the products or services we offer, or result in adverse publicity and harm our reputation. Finally, new privacy and cybersecurity laws have come into effect in China, as explained below under “*Risks related to our international operations*” section.

Risks Related to Regulations

We are and may continue to be subject to claims, lawsuits, government actions, inquiries or investigations, and other proceedings that may adversely affect our business, financial condition, and results of operations.

We are and may continue to be subject to claims, lawsuits, arbitration proceedings, regulatory or government actions, inquiries or investigations, and other legal and regulatory proceedings as our business grows and as we deploy new offerings, including proceedings related to our products, including safety of our technology, or our acquisitions, securities issuances or business practices. As previously disclosed in our Current Report on Form 8-K filed on November 7, 2022, in connection with the filing of our Current Report on Form 8-K filed on October 31, 2022, we proactively reached out to the SEC and received an initial request for information from the SEC. Since the initial outreach, we and certain of our current and former directors and officers received subpoenas from the SEC requesting the production of Company documents. We have cooperated, and intend to continue to fully cooperate, with the SEC's investigation.

In addition, since we entered into a National Security Agreement ("NSA") on February 18, 2022, there are regular inquiries and communications with the Committee on Foreign Investments in the United States ("CFIUS") in connection with the ongoing monitoring of our compliance under the NSA. We are cooperating with an inquiry by CFIUS concerning our compliance with the NSA as it relates to information shared by TuSimple U.S. with TuSimple China, Hydron, and Hydron's partners. If CFIUS concludes that information shared with TuSimple China, Hydron and Hydron's partners was shared in violation of the terms of the NSA, or that the removal of our security director from the Board in November 2022 violated the terms of the NSA, it may impose a civil penalty on us. The Audit Committee, the Government Security Committee, the Board, and the Company are committed to cooperating fully as discussions with CFIUS continue. While we cannot provide any assurances as to the outcome of any of the foregoing at this time, the resolution of any of the foregoing, including any remedial measures, fines, or penalties imposed on us, could have a material adverse impact on our business, financial condition, and results of operations.

These regulatory investigations and the results of any other such claims, lawsuits, arbitration proceedings, regulatory or government actions, inquiries or investigations, or other legal or regulatory proceedings that may arise cannot be predicted with certainty. Any claims, inquiries, or investigations against us, whether meritorious or not, could be time-consuming, result in costly litigation, considerable legal expenses, payment of damages, settlement costs, remedial measures, fines or penalties, be harmful to our reputation, require significant management attention, and divert significant resources from or otherwise harm our business. Determining reserves for litigation and regulatory actions is a complex and fact-intensive process that requires significant subjective judgment and speculation. It is possible that such proceedings could result in substantial damages, settlement costs, remedial measures, fines, and penalties that could adversely affect our business, financial condition and results of operations. These proceedings could also result in harm to our reputation and brand and could result in sanctions, consent decrees, injunctions, or other orders against the Company and/or our current and/or former directors and officers requiring a change in our business practices. Any of these consequences could have a material adverse impact on our business, financial condition, and results of operations.

Our business may be adversely affected by changes in automotive safety regulations, enforcement of such regulations, or concerns that drive further regulation of the automobile safety market.

Government vehicle safety regulations have a substantial impact on our business, prospects, and our future plans. Government safety regulations are subject to change based on a number of factors that are not within our control, including new scientific or technological data, adverse publicity regarding industry recalls and safety risks associated with autonomous driving technology, accidents involving autonomous vehicles, domestic and foreign political developments or considerations, and litigation relating to autonomous vehicles. Changes in government regulations, especially in autonomous driving and the freight industry could adversely affect our business. If government priorities shift and we are unable to adapt to changing regulations, our business may be materially and adversely affected.

The costs of complying with safety regulations could increase as regulators impose more stringent compliance and reporting requirements in response to product recalls and safety issues in the automotive industry. As the semi-trucks that carry our systems go into production, we will be subject to existing stringent requirements under the National Traffic and Motor Vehicle Safety Act of 1966 (the "Vehicle Safety Act"), including a duty to report, subject to strict timing requirements, safety defects. The Vehicle Safety Act imposes potentially significant civil penalties for violations including the failure to comply with such reporting actions. We are also subject to the existing U.S. Transportation Recall Enhancement, Accountability and Documentation Act (the "TREAD Act"), which requires motor vehicle equipment manufacturers, such as us, to comply with "Early Warning" requirements by reporting certain information to the National Highway Traffic Safety Administration (the "NHTSA") such as information related to defects or reports of injury. The TREAD Act imposes criminal liability for violating such requirements if a defect subsequently causes death or bodily injury. In addition, the National Traffic and Motor Vehicle Safety Act authorizes NHTSA to require a manufacturer to recall and repair vehicles that contain safety defects or fail to comply with U.S. federal motor vehicle safety standards. Sales into foreign countries may be subject to similar regulations.

In April 2022, the Federal Motor Carrier Safety Administration initiated an investigation into an accident involving one of our trucks, which resulted in no injuries and minor damage to our vehicle. We cooperated with the investigation, and it was concluded without any penalties brought against us. However, this accident resulted in negative publicity about the safety of our autonomous driving technology. If we cannot rapidly address any safety concerns or defects with our products or there are additional accidents involving our products, our brand, relationships with users, business, results of operations, and financial condition will be adversely affected.

Our operations outside of the U.S. are subject to similar foreign compliance, safety, environmental and other regulations. Many of those regulations are different from those applicable in the U.S. and may require redesign and/or retesting. For example, in China, when our products or vehicles equipped with our products enter into the stage of mass-production and launch for sale, we will be subject to the Product Quality Law, which requires industrial products that may be hazardous to human health and personal or property safety, such as vehicles and accessories, to meet certain safety standards. In addition, our products are also subject to the Regulations on the Administration of Defective Automobile Product Recall and Measures for the Implementation of Regulations on the Administration of Defective Automobile Product Recall, which may lead to our liability if a defect is caused by our products. Any violation of the above laws and regulations may cause civil, administrative, and even criminal liabilities. Since there is not a specific vehicle safety law in China, the rules might scattered across other regulations. In February 2023, Shanghai officially launched and implemented the "Implementation Rules for Promoting the Innovation and Application of Fully Driverless Intelligent Connected Vehicles," which is the first local legislation in China focused on the innovation and application of fully driverless intelligent and connected vehicles. It provides a legal foundation and institutional support for fully driverless intelligent connected vehicles to carry out various innovation and application activities such as on-road testing, demonstrations, and commercial operations in Lingang New Area.

We are subject to substantial regulations, including regulations governing autonomous vehicles, and unfavorable changes to, or failure by us to comply with, these regulations could substantially harm our business and operating results.

Our L4 autonomous semi-trucks are subject to substantial regulation under international, federal, state, and local laws. Regulations designed to govern autonomous vehicle operation, testing and/or manufacture are still developing and may change significantly. These regulations could include requirements that significantly delay or narrowly limit the commercialization of autonomous vehicles, limit the number of autonomous vehicles that we can manufacture or use on our platform, impose restrictions on the number of vehicles in operation and the locations where they may be operated or impose significant liabilities on manufacturers or operators of autonomous vehicles or developers of autonomous vehicle technology. If regulations of this nature are implemented, we may not be able to commercialize our autonomous vehicle technology in the manner we expect, or at all. In addition, the costs of complying with such regulations could be prohibitive and prevent us from operating our business in the manner we intend.

The U.S. Department of Transportation issued regulations in 2016 that require manufacturers of certain autonomous vehicles to provide documentation covering specific topics to regulators, such as how automated systems detect objects on the road, how information is displayed to drivers, what cybersecurity measures are in place and the methods used to test the design and validation of autonomous driving systems. If the obligations associated with complying with safety regulations increase, we may be required to increase resources, divert management's attention, and adversely affect our business.

We operate in a highly regulated industry and increased costs of compliance with, or liability for violation of, existing or future regulations could have a materially adverse effect on our business.

Our operations are authorized and regulated by various federal and state agencies in the United States and in international jurisdictions in which we operate that generally govern autonomous vehicle operation, testing, and/or manufacture. Further, we are subject to international, federal, state, and local laws and regulations governing pollution, protection of the environment, and occupational health and safety, including those related to the use, generation, storage, management, discharge, transportation, disposal, and release of, and human exposure to, hazardous and toxic materials. Such laws and regulations have tended to become more stringent over time.

Fines, penalties, costs, or liabilities associated with such existing or new regulations or laws, including as a result of our failure to comply, could be substantial and in certain cases joint and several, and could adversely impact our business, prospects, financial condition, and operating results.

Risks Related to Our International Operations

Our operations in China are subject to significant government regulation, as well as a variety of legal, political, and economic risks. If the Chinese government modifies its laws and regulations, or interprets and enforces these laws and regulations in a manner that is adverse to our business in China, our consolidated business and results of operations may be materially harmed.

Our operations in China are conducted by our Chinese subsidiaries (collectively, “TuSimple China”) pursuant to local laws and regulations that are uncertain and evolving. These regulations contain a number of financial and operational restrictions for Chinese companies. The laws and regulations are also subject to discretionary interpretation and enforcement by various state, provincial, and municipal level officials in China. Regulators in China may modify current laws and regulations or change how they interpret and enforce them. As a result, there can be no assurance that the Chinese government’s current or future interpretation and application of existing and new regulations will not negatively impact our business in China, result in regulatory investigations or lead to fines or penalties against us.

The Chinese government also exercises significant control over the Chinese economy, including through controlling capital, foreign currency exchange, foreign exchange rates, and tax regulations, providing preferential treatment to certain industry segments or companies and issuing required licenses to conduct business. Any adverse change in the Chinese governmental, economic, or other policies could have a material adverse effect on TuSimple China’s business and our consolidated results of operations.

China’s legal system is substantially different from the legal system in the United States and may raise risks and uncertainties concerning the intent, effect, and enforcement of its laws, rules, and regulations.

China’s legal system is a civil law system based on written statutes. Unlike the common law system, prior court decisions under the civil law system may be cited for reference but have limited precedential value. Since China’s legal system continues to rapidly evolve, the interpretations and enforcement of these laws and regulations are not always uniform and involve uncertainties. In addition, any new or amended laws and regulations related to, among other things, foreign investment and manufacturing could have a material adverse effect on our business and our ability to operate our business in China.

From time to time, we may have to resort to administrative and court proceedings to enforce our legal rights. Any administrative and court proceedings in China may be protracted, resulting in substantial costs and diversion of resources and management attention. Since China’s administrative and court authorities have significant discretion in interpreting and implementing statutory provisions and contractual terms, it may be more difficult to evaluate the outcome of administrative and court proceedings and the level of legal protection than those that may be provided in other jurisdictions. These uncertainties may impede our ability to enforce contracts in China and could materially and adversely affect our business and results of operations.

Furthermore, China’s legal system is based in part on government policies and internal rules, some of which are not published on a timely basis, or at all, and may have retroactive effect. As a result, we may not be aware of our violation of any of these policies and rules until some time after the violation may have occurred. Such unpredictability towards our contractual, property and procedural rights and any failure to quickly respond to changes in the regulatory environment in China could adversely affect our business and impede our ability to continue our operations and proceed with our future business plans in China.

We are subject to restrictions on cross-border data transfer. The transfer of information out of China is complex and there is a lack of clear guidance provided under the existing rules.

In China, the PRC Cyber Security Law became effective on June 1, 2017 (the “Cyber Security Law”). The Cyber Security Law reaffirms the basic principles and requirements specified in other existing laws and regulations on personal information protection, such as requirements on the collection, use, processing, storage, and disclosure of personal information. Specifically, it requires that network operators take technical measures and other necessary measures in accordance with applicable laws and regulations and the compulsory requirements of the national and industrial standards to safeguard the safe and stable operation of its networks, maintain the integrity, confidentiality, and availability of network data, take technical and other necessary measures to ensure the security of the personal information they have collected against unauthorized access, alteration, disclosure, or loss, and formulate contingency plans for network security incidents and remediation measures. It also requires a subset of network operators that meet certain thresholds to be critical information infrastructure operators (“CIIO”) to store personal information and important data collected and generated during its operation within the territory of China locally on servers in China. The interpretation of what network operators are qualified as CIIOs is unclear. If we are deemed to be a CIIO, we would become subject to additional requirements applicable to CIIOs. If deemed applicable, any violation of the Cyber Security Law may subject us to warnings, fines, confiscation of illegal gains, revocation of licenses, cancellation of filings, shutdown of websites, or criminal liabilities, which could be costly and may have a material and adverse impact on our business, financial condition, and operating results.

We face risks associated with our international operations and expansion to new markets, including unfavorable regulatory, political, tax, and labor conditions, which could harm our business.

We face risks associated with our current and future international operations, including in jurisdictions where we have not previously conducted business, and we also expect our international operations to expand. We have international operations in China and subsidiaries in Hong Kong, Europe, Canada, and Japan that are subject to the legal, political, regulatory, and social requirements and economic conditions in these jurisdictions.

Political tensions between the United States and China have escalated in recent years due to various geopolitical factors. In addition to the historical events, such as increased trade barriers since 2018 and the COVID-19 pandemic, the relationship between the United States and China continues to be subject to geopolitical uncertainties. For example, in 2021, the U.S. administration maintained tariffs on Chinese imports, sanctioned certain Chinese officials, blacklisted dozens of Chinese companies, and expanded the ban on American investment in Chinese firms with ties to the military. Furthermore, in August 2023, the U.S. government issued an executive order that seeks to restrict, or require notification of, new investments by U.S. persons into certain national security technologies and products in China. These requirements are expected to be implemented in 2024.

These tensions have affected both diplomatic and economic ties between the two countries. Heightened tensions could reduce levels of trade, investments, technological exchanges, and other economic activities between the two major economies, and adversely impact our business as a result. Additionally, the United States and various governments have imposed controls, export license requirements and restrictions on the import or export of technologies and products, especially related to semiconductor, artificial intelligence, and other high-tech areas, which could have a material and adverse effect on our business, financial condition, and results of operations. Existing tensions and any further deterioration in international political relations between the U. S. and China may have a negative impact on the general, economic, political, and social conditions across the globe and adversely impact our business, financial condition. and results of operations.

Additionally, as part of our long-term growth strategy, we intend to expand our services into other international locations. We are and will be subject to a number of risks associated with international business activities that may increase our costs, impact our ability to expand on a global basis, and require significant management attention. These risks include, but not limited to:

- conforming the semi-trucks equipped with our autonomous technology to various international regulatory requirements as applicable;
- difficulty in staffing and managing foreign operations;
- difficulties attracting users in new jurisdictions;
- differing driving and traffic behavior and road designs and infrastructure in a range of countries, which could delay our ability to enter and expand in different markets;
- foreign government taxes, regulations, and permit requirements;
- fluctuations in foreign currency exchange rates and interest rates;
- U. S. and foreign government trade restrictions, tariffs, and price or exchange controls;
- compliance by us and our business partners with import and export control laws, tariffs, trade barriers, economic sanctions, and other regulatory limitations on our ability to provide our services and products in certain international markets;
- compliance with U.S. and foreign anti-bribery laws, including the Foreign Corrupt Practices Act and the U.K. Anti-Bribery Act, violations of which could lead to significant fines, penalties, and collateral consequences for our company;
- difficulty in attracting, recruiting, and retaining talent internationally;
- any future restructuring or reduction in workforce;
- foreign labor laws, regulations, and restrictions;
- changes in diplomatic and trade relationships;
- political instability, natural disasters, war, and the outbreak of other hostilities or events of terrorism; and
- the strength of international economies.

If we fail to successfully address these risks, our business, prospects, operating results and financial condition could be materially harmed.

We depend on an international supply chain that is subject to risk of foreign regulatory requirements and trade policy. Changes to trade policy, tariffs, and import/export regulations have and may continue to have a material adverse effect on our business, financial condition, and results of operations.

Many of the components for outfitting our trucks are sourced from international third-party suppliers. Changes in global political, regulatory and economic conditions, or in laws and policies governing foreign trade, manufacturing, development, and investment in the territories or countries where we currently purchase components, could adversely affect our business. The United States has recently instituted or proposed changes in trade policies that include the negotiation or termination of trade agreements, the imposition of higher tariffs on imports into the U. S., economic sanctions on individuals, corporations, or countries, and other government regulations affecting trade between the U. S. and other countries. A number of other nations have proposed or instituted similar measures directed at trade with the U. S. in response. For example, new U.S. export control regulations have and could continue to adversely affect the international automotive markets, and our ability to access key components such as semiconductor chips, which are an important component of our trucks. As a result of these developments, there may be greater restrictions and economic disincentives on international trade that could adversely affect our business, financial condition, and results of operations.

For example, such changes could adversely affect the automotive market and our ability to access or transport key components, such as our TuSimple Domain Controller. It may be time-consuming and expensive for us to alter our business operations to adapt to or comply with any such changes, and any failure to do so could have a material adverse effect on our business, financial condition, and results of operations.

We are and may continue to be subject to various restrictions under U.S. export control laws and regulations, including the U.S. Department of Commerce's Export Administration Regulations (EAR). The U.S. export control laws include restrictions or prohibitions on the sale or supply of certain products and services to U.S. embargoed or sanctioned countries, governments, persons, and entities, and also require authorization for the export of certain products using encryption technology. In addition, various countries regulate the import of certain artificial intelligence technology, including through import permitting and licensing requirements and have enacted or could enact laws that could limit our ability to distribute our services in those countries. Changes in our offerings, technologies, or semi-trucks, or changes in export and import laws, may delay the introduction and growth of our business in international markets, prevent our users with international operations from using our services, or, in some cases, prevent the access or use of our services to and from certain countries, governments, persons, or entities altogether. Further, any change in export or import regulations or related laws, shift in the enforcement or scope of existing regulations, or change in the countries, governments, persons, or technology targeted by such regulations could result in decreased use of our services or in our decreased ability to export or sell our services to existing or potential users with international operations. For example, new U.S. export control regulations have and could continue to adversely affect the international automotive markets, and our ability, to access key components such as semiconductor chips, which are an important component of our trucks. As a result of these developments, there may be greater restrictions and economic disincentives on international trade that could adversely affect our business, financial condition, and results of operations. Additionally, any decreased use of our services or products or limitation on our ability to export or sell our services or products would likely harm our business.

Investments in us have been and may be subject to U.S. foreign investment regulations which may impose conditions or limitations on certain investors (including, but not limited to, limits on purchasing our Common Stock, limits on information sharing with such investors, requiring a voting trust, governance modifications, forced divestiture, or other measures).

Certain investments that involve the acquisition of, or investment in, a U.S. business may be subject to review and approval by CFIUS, depending on the structure, beneficial ownership, and control of interests in the U.S. business. CFIUS is a committee comprised of multiple U.S. government agencies, led by the Department of the Treasury, authorized to review and investigate certain transactions in which a foreign person acquires an interest in a U.S. business (including certain minority investments) in order to determine the effect of such transactions on the national security of the U. S. Investments that result in control of a U.S. business by a foreign person are subject to CFIUS jurisdiction. Significant CFIUS reform legislation, which was fully implemented through regulations that became effective on February 13, 2020, among other things expanded the scope of CFIUS’s jurisdiction to investments that do not result in control of a U.S. business by a foreign person but afford certain foreign investors certain information or governance rights in a U.S. business that has a nexus to “critical technologies,” “critical infrastructure,” and/or “sensitive personal data.” Moreover, other countries continue to strengthen their own foreign investment clearance (“FIC”) regimes, and investments and transactions outside of the U.S. may be subject to review by non-U.S. FIC regulators if such investments are perceived to implicate national security policy priorities. Any review and approval of an investment or transaction by CFIUS or another FIC regulator may have outsized impacts on transaction certainty, timing, feasibility, and cost, among other things. CFIUS and other FIC regulatory policies and practices are rapidly evolving, and in the event that CFIUS or another FIC regulator reviews one or more proposed or existing investment by investors in us, there can be no assurances that such investors will be able to maintain, or proceed with, such investments on terms acceptable to such investors. CFIUS and other FIC regulators may seek to impose limitations or restrictions on, or prohibit, investments by such investors (including, but not limited to, limits on purchasing our Common Stock, limits on information sharing with such investors, requiring a voting trust, governance modifications, or forced divestiture, among other things).

On March 1, 2021, the CFIUS Staff Chairperson, acting at the direction of CFIUS, requested that we file a written notice regarding the 2017 purchase of shares of our Series B redeemable convertible preferred stock by Sun Dream Inc., an affiliate of Sina Corporation (the “Sina Investment”). CFIUS formally accepted our notice, which was filed jointly with Sina Corporation.

After accepting our jointly filed notice, CFIUS informed us that the transaction that is the subject of its review (the “2017 Transaction”) is the 2017 acquisition of the U.S. business of TuSimple LLC by TuSimple (Cayman) Limited, rather than the Sina Investment.

On February 18, 2022, CFIUS concluded its review of the 2017 Transaction and determined that there are no unresolved national security concerns.

As part of the resolution, on February 18, 2022, we entered into a National Security Agreement (“NSA”) with CFIUS. In addition, former directors of the Company representing Sun Dream Inc., one of our stockholders, had agreed that they would not stand for re-election to our Board upon expiration of their terms, and Sun Dream, Inc. had agreed that it would not nominate replacement candidates or increase its current shareholdings in the Company. The two directors representing Sun Dream Inc. were not nominated for re-election at our annual meeting of stockholders for 2022.

On November 10, 2022, four directors on our Board, which included all members of the Government Security Committee of the Company's Board (“GSC”), were removed from our Board. As a result, CFIUS informed us that we must appoint a security director and reconstitute the GSC. On December 7, 2022, the Board appointed James Lu to the Board as an independent director. On December 15, 2022, the Board appointed Wendy Hayes and Michael Mosier to the Board as independent directors. Michael Mosier was appointed as our security director after he passed through extensive background checks and received non-objection from CFIUS. On April 17, 2023, J. Tyler McGaughey succeeded Michael Mosier as our security director.

We are subject to various requirements and restrictions under the NSA, and we have incurred and expect to incur significant costs to comply with those requirements and may be subject to monetary penalties and/or the appointment of a third-party monitor if we do not comply with the requirements and restrictions under the NSA, or if CFIUS determines, at their election, to require us to appoint a third-party monitor. In addition, restrictions under the NSA could limit our business activities.

Under the NSA, we have agreed to limit access to certain data and adopt a technology control plan, appoint a security officer and a security director, establish a GSC to be chaired by the security director, and periodically meet with and report to certain CFIUS monitoring agencies. In April 2022, we established the GSC. As described above, the GSC is currently composed of three independent directors, one of whom acts as security director.

We do not know the exact amount of time and resources that we will need to expend to comply with the NSA. Nevertheless, we have incurred and expect to incur substantial costs to implement these and other requirements under the NSA. In addition, management and the members of our GSC have devoted, and we expect we will continue to devote, substantial time and attention to implement and comply with these requirements. Furthermore, we also periodically receive inquiries from CFIUS regarding our compliance with the terms of the NSA.

Pursuant to the terms of our NSA, CFIUS can elect to require us to appoint a third-party monitor at any time. Additionally, failure to comply with our obligations under the NSA, including the governance requirements, could result in monetary penalties and/or the appointment of third-party monitor and could materially and adversely impact our ability to operate our business by limiting the scope of future business activities.

Risks Related to Our Class A Common Stock

The dual class structure of our common stock has the effect of concentrating voting control with certain stockholders, in particular, our Founders, which will limit your ability to influence the outcome of important transactions, including a change in control.

Our Class B common stock has ten votes per share, and our Class A common stock has one vote per share. Our founders, Mo Chen and Xiaodi Hou (collectively, the “Founders”), are the only holders of our shares of Class B common stock. Mr. Chen beneficially holds, as of August 2023, approximately 58% of the voting power of the outstanding common stock as a result of a proxy and voting agreement between our Founders, as disclosed in our Current Report on Form 8-K, filed on November 16, 2022 with the SEC. See Item 10, under section “*Voting Agreement*.” On November 10, 2022, pursuant to a written consent, the Founders consented to the removal of four members of our Board. Because of the ten-to-one voting ratio between Class B and Class A common stock and the proxy and voting agreement between our Founders, Mr. Chen continues to control a majority of the combined voting power of our common stock and therefore is able to control all matters submitted to our stockholders for approval. Our Founders have and may again in the future remove some or all of the members of our Board, in each case so long as the shares of Class B common stock represent at least 50% of all outstanding voting power of our Class A and Class B common stock. Further, the concentrated control of our common stock will limit or preclude your ability to influence corporate matters for the foreseeable future.

Future transfers of Class B common stock by our Founders will generally result in those shares converting to Class A common stock, subject to limited exceptions, including the ability of each of our Founders to grant their voting proxy with respect to their Class B common stock to the other Founder. In addition, each share of our Class B common stock will automatically convert, on a one-for-one basis, into shares of Class A common stock on the earliest of (i) the date specified by a vote of the holders of Class B common stock representing 75% of the outstanding shares of Class B common stock, (ii) the date that is between 90 days and 270 days, as determined by the board of directors, after the death or incapacitation of the last Founder to die or become incapacitated, or (iii) the date that is between 61 and 180 days, as determined by the board of directors, after the date on which the number of outstanding shares of Class B common stock held by the Founders (or their permitted affiliates) represents less than 50% of the total number of shares of Class B common stock held collectively by the Founders (or their permitted affiliates) at 11:59 pm Pacific Time on April 19, 2021. For a description of the dual class structure, see the section titled “Common Stock” within Exhibit 4.1 of this Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

We are a “controlled company” as defined in the Nasdaq Listing Rules and, as a result, qualify for exemptions from certain corporate governance requirements. You may not have the same protections afforded to stockholders of companies that are subject to such requirements.

As disclosed in our Current Report on Form 8-K, filed on November 16, 2022 with the SEC, we are a “controlled company” under the Nasdaq Listing Rules due to the fact that Mr. Chen beneficially owns more than 50% of the Company's voting power. As of August 2023, Mr. Chen beneficially owns approximately 58% of the voting power of the outstanding common stock. Under these Nasdaq Listing Rules, a company of which more than 50% of the voting power in the election of directors is held by an individual, group or another company is a “controlled company” and may elect not to comply with certain corporate governance requirements, including the requirements that (i) a majority of the board of directors consist of independent directors and (ii) the board of directors have compensation and nominating and corporate governance committees composed entirely of independent directors.

These exemptions do not modify the independence requirements for our Audit Committee and we are compliant with Nasdaq Listing Rules, as well as SEC rules, for our Audit Committee and our Nominating and Corporate Governance Committee. Currently, our Compensation Committee is not composed entirely of independent directors, as permitted under the exemption stated above. We maintain the option to fully utilize these exemptions as a “controlled company.” In the event that we cease to be a “controlled company” and our shares continue to be listed on Nasdaq, we will be required to comply with these provisions within the applicable transition periods.

The dual class structure of our common stock may adversely affect the trading market for our Class A common stock.

Our dual class structure, combined with the concentrated control of our Founders, directors, officers and employees, and their affiliates, may result in a lower or more volatile market price of our Class A common stock or in adverse publicity or other adverse consequences. For example, certain index providers have announced restrictions on including companies with multiple class share structures in certain of their indexes. In July 2017, FTSE Russell and Standard & Poor’s announced that they would cease to allow most newly public companies utilizing dual or multi-class capital structures to be included in their indices. Under the announced policies, our dual class capital structure would make us ineligible for inclusion in any of these indices. Given the sustained flow of investment funds into passive strategies that seek to track certain indexes, exclusion from stock indexes would likely preclude investment by many of these funds and could make our Class A common stock less attractive to other investors. As a result, the market price of our Class A common stock could be adversely affected.

Prior to the listing of our Class A common stock, there was no public market for our Class A common stock. Since our IPO in April 2021, the stock price of our Class A common stock has experienced volatility and the market prices of securities of other newly public companies have historically been highly volatile. The public trading price of our Class A common stock could be subject to fluctuations in response to various factors, including those listed in this Annual Report on Form 10-K, some of which are beyond our control. Factors that could cause fluctuations in the public trading price of our Class A common stock include the following:

- overall performance of the equity markets;
- our operating performance and the performance of other similar companies;
- changes in the estimates of our operating results that we provide to the public, our failure to meet these projections, or changes in recommendations by securities analysts that elect to follow our common stock;
- announcements of technological innovations, new products, acquisitions, strategic alliances, or significant agreements by us or by our competitors;
- rumors and market speculation involving us or other companies in our industry, which may include short seller reports;
- any coordinated trading activities or large derivative positions in our Class A common stock, for example, a "short squeeze" (a short squeeze occurs when a number of investors take a short position in a stock and have to buy the borrowed securities to close out the position at a time that other short sellers of the same security also want to close out their positions, resulting in surges in stock prices, i.e., demand is greater than supply for the stock sold short);
- detrimental adverse publicity about us, our services, or our industry;
- recruitment or departure of key personnel, including through any future restructuring or reduction in workforce;
- supply chain disruptions;
- litigation involving us, our industry, or both, or actions, inquiries, or investigations by regulators into our operations or those of our competitors;
- new laws or regulations or new interpretations of existing laws or regulations applicable to our business;
- interest rates, the economy as a whole, market conditions in our industry, and the industries of our users;
- trading activity by a limited number of stockholders who together beneficially own a majority of our outstanding common stock;
- the expiration of market standoff or contractual lock-up agreements; and
- sales of shares of our Class A common stock by us or our stockholders.

Our future capital needs may require us to sell additional equity or debt securities that may dilute our stockholders.

Future sales and issuances of our share capital or rights to purchase our share capital could result in substantial dilution to our existing stockholders. We may sell Class A common stock, convertible securities, and other equity securities in one or more transactions at prices and in a manner as we may determine from time to time. If we sell any such securities in subsequent transactions, investors may be materially diluted. New investors in such subsequent transactions could gain rights, preferences, and privileges senior to those of holders of our Class A common stock.

We may fail to meet our publicly announced guidance or other expectations about our business, which could cause our stock price to decline.

We may provide from time to time guidance regarding our expected financial and business performance, which may include projections regarding sales and production, as well as anticipated future revenues, gross margins, profitability, and cash flows. Correctly identifying key factors affecting business conditions and predicting future events is inherently an uncertain process, and our guidance may not ultimately be accurate and has in the past been inaccurate in certain respects, such as the timing of new products. Our guidance is based on certain assumptions such as those relating to anticipated production and sales, average sales prices, supplier and commodity costs, and planned cost reductions. If our guidance is not accurate or varies from actual results due to our inability to meet our assumptions or the impact on our financial performance that could occur as a result of various risks and uncertainties, the market value of our common stock could decline significantly.

Because we do not expect to pay dividends in the foreseeable future, investors must rely on price appreciation of our Class A common stock for return on the investment.

We currently intend to retain most, if not all, of our available funds and any future earnings to fund the growth of our business. As a result, we do not expect to pay any cash dividends in the foreseeable future. Therefore, you should not rely on an investment in our Class A common stock as a source for any future dividend income.

Our Board has complete discretion as to whether to distribute dividends. Even if our Board decides to declare and pay dividends, the timing, amount, and form of future dividends, if any, will depend on, among other things, our future results of operations and cash flow, our capital requirements and surplus, our financial condition, contractual restrictions, and other factors deemed relevant by our Board. Accordingly, the return on your investment in our Class A common stock will likely depend entirely upon any future price appreciation of our Class A common stock. There is no guarantee that our Class A common stock will appreciate in value or even maintain the price at which you purchased the Class A common stock. You may not realize a return on your investment in our Class A common stock and you may even lose your entire investment in our Class A common stock.

If securities or industry analysts do not publish research or reports about our business or if they issue an adverse or misleading opinion regarding our Class A common stock, our share price and trading volume could decline.

The trading market for our Class A common stock will be influenced by the research and reports that industry or securities analysts publish about us or our business. We do not have any control over these analysts. If any of the analysts who cover us issue an adverse or misleading opinion regarding us, our business model, our financial statements, our intellectual property, or our share performance, our share price would likely decline. If one or more of these analysts cease coverage of us or fail to publish reports on us regularly, we could lose visibility in the financial markets, which in turn could cause our share price or trading volume to decline.

Sales of a substantial number of shares of our Class A common stock in the public market could cause our share price to fall.

Sales of substantial amounts of our Class A common stock in the public market, or the perception that these sales could occur, could adversely affect the market price of our Class A common stock and could materially impair our ability to raise capital through equity offerings in the future. Many of our existing security holders have substantial unrecognized gains on the value of the equity they hold, and may take, or attempt to take, steps to sell, directly or indirectly, their shares or otherwise secure, or limit the risk to, the value of their unrecognized gains on those shares.

The requirements of being a public company may materially strain our resources, divert management's attention, and affect our ability to attract and retain qualified board members.

As a public company, we have incurred, and will continue to, incur significant legal, accounting, and other expenses that we did not incur as a private company. In addition, changing laws, regulations, and standards relating to corporate governance and public disclosure, including regulations implemented by the Public Company Accounting Oversight Board, the SEC, and the Nasdaq Global Select Market, have increased and will continue to increase our legal and financial compliance costs and make some activities more time consuming. These laws, regulations, and standards are subject to varying interpretations, and as a result, their application in practice may evolve over time as new guidance is provided by regulatory and governing bodies. We intend to invest resources to comply with evolving laws, regulations, and standards, and this investment may result in increased general and administrative expenses and a diversion of management's time and attention from revenue-generating activities to compliance activities. If, notwithstanding our efforts, we fail to comply with new laws, regulations, and standards, regulatory authorities may initiate legal proceedings against us and our business may be harmed.

Failure to comply with these rules might also make it more difficult for us to obtain certain types of insurance, including director and officer liability insurance, and we might be forced to accept reduced policy limits and coverage or incur substantially higher costs to obtain the same or similar coverage. The impact of these events could also make it more difficult for us to attract and retain qualified persons to serve on our Board, or on committees of our Board, or as members of senior management.

In addition, as a result of our disclosure obligations as a public company, we will have reduced strategic flexibility and will be under pressure to focus on short-term results, which may adversely affect our ability to achieve long-term profitability.

Our failure to timely and effectively implement controls and procedures required by Sections 404(a) and 404(b) of the Sarbanes-Oxley Act could have a material adverse effect on our business.

As a public company, we are required to provide management's assessment regarding internal control over financial reporting in our Annual Report on Form 10-K. The standards required for a public company under Section 404(a) of the Sarbanes-Oxley Act are significantly more stringent than those required of TuSimple as a private company. Management may not be able to effectively and timely implement controls and procedures that adequately respond to the increased regulatory compliance and reporting requirements that became applicable after transitioning from a private company. If we are not able to implement the additional requirements of Section 404(a) in a timely manner or with adequate compliance, we may not be able to assess whether our internal controls over financial reporting are effective, which may subject us to adverse regulatory consequences and could harm investor confidence and the market price of our securities.

Our independent registered public accounting firm may issue a report that is adverse in the event it is not satisfied with the level at which our internal control over financial reporting is documented, designed, or operating. For additional details, please see the risk factor, "*We have identified, and may in the future identify, material weaknesses in our internal control over financial reporting.*"

We are and may continue to be subject to securities litigation, which is expensive and could divert our management's attention.

Companies that have experienced volatility in the market price of their securities have been subject to securities class action litigation. We are currently and may continue to be the target of securities class action litigation or stockholder derivative claims in the future or subject to other disputes, which may include, among others, claims based on media reports or negative publicity, claims related to matters disclosed in our SEC filings, claims invoking the federal and state securities laws, contractual claims, or other claims related to regulatory compliance and reporting requirements. For example, securities class action complaints have been filed on behalf of a class of stockholders who acquired our securities, against us, certain of our current and former officers and directors, and the underwriters who underwrote our IPO.

On August 31, 2022, a securities class action (the "August 2022 Action") was filed in the United States District Court for the Southern District of California, against us and certain of our current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through August 1, 2022. The August 2022 Action is captioned: *Dicker v. TuSimple Holdings, Inc. et al.*, 3:22-cv-01300-JES-MSB (S. D. Cal.). The complaint filed in the August 2022 Action alleges, among other things, that we and certain of our current and former directors and officers violated Sections 11 and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act by making materially false or misleading statements, or failing to disclose information it was required to disclose, regarding our autonomous driving technology. The complaint seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys' fees.

On November 10, 2022, a second securities class action (the "November 2022 Action") was filed in the United States District Court for the Southern District of New York against us and certain of our current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Eric Tapia, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through October 31, 2022. The November 2022 Action was originally captioned: *Woldanski v. TuSimple Holdings, Inc., et al.* Woldanski v. TuSimple Holdings, Inc., et al., 1:22-cv-09625-AKH (S.D.N.Y.). The complaint in the November 2022 Action alleges, among other things, that we and certain of our current and former directors and officers violated Sections 11, 12(a), and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act, by making false or misleading statements, or failing to disclose information it was required to disclose, regarding our related party transaction with Hydron and our sharing of confidential information and proprietary technology with Hydron without approval from our Board. The complaint filed in the November 2022 Action seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys' fees. The November 2022 Action was transferred to the Southern District of California and is now captioned: *Woldanski v. TuSimple Holdings, Inc., et al.*, 3:23-cv-00282-JES-MSB (S. D. Cal.).

On May 3, 2023, we made a motion to consolidate the August 2022 Action and November 2022 Action, which motion was granted in July 2023. The plaintiffs have until October 2, 2023 to file a consolidated and amended complaint. The consolidated and amended complaint, and any future amended complaint, may include additional or alternate allegations regarding liability or alternate or additional claims for relief. We are unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, lawsuit, which could be material. We are also party to certain shareholder derivative actions and are unable to estimate the potential loss or range of loss, if any, associated with this, or any similar lawsuit, which could be material. For further information on the shareholder derivative actions, see “*Legal Proceedings*” in Item 3 of Part I of this Annual Report on Form 10-K.

There can be no assurance that we will be able to prevail in our defense or reverse any unfavorable judgment on appeal, and we may decide to settle lawsuits on unfavorable terms. Any adverse outcome of these cases and any other such cases, including any plaintiffs’ appeal of the judgment in these cases, could result in payments of substantial monetary damages or fines, or changes to our business practices, and thus have a material adverse effect on our business, financial condition, results of operation, cash flows, and reputation. In addition, there can be no assurance that our insurance carriers will cover all or part of the defense costs, or any liabilities that may arise from these matters. The litigation process may utilize a significant portion of our cash resources and divert management’s attention from the day-to-day operations of our company, all of which could harm our business.

We are and may continue to be subject to claims for indemnification related to these and other related matters. For example, the underwriters named in the August 2022 Action's complaint have requested that we indemnify them for any expenses and losses incurred in connection with that litigation. The underwriters have also requested that we indemnify them for any expenses and losses incurred in connection with a securities class action filed on October 7, 2022 in the Superior Court of the County of San Diego, California, asserting claims against the underwriters under Sections 11 and 12 of the Securities Act. We cannot predict the impact that indemnification claims may have on our business or financial results.

Anti-takeover provisions in our charter documents may discourage our acquisition by a third party, which could limit our stockholders’ opportunity to sell their shares, at a premium.

Our amended and restated certificate of incorporation includes provisions that could limit the ability of others to acquire control of our company, could modify our structure or could cause us to engage in change-of-control transactions. These provisions could have the effect of depriving our stockholders of an opportunity to sell their shares at a premium over prevailing market prices by discouraging third parties from seeking to obtain control in a tender offer or similar transaction. Among other things, the charter documents provide:

- for a dual class common stock structure, which provides our Founders with the ability to control the outcome of matters requiring stockholders’ approval;
- until the first date on which the outstanding shares of Class B common stock represent less than 40% of the total voting power of our common stock, we shall not consummate any transaction that would result in a change in control of us without first obtaining the affirmative vote of the holders of a majority of the then-outstanding shares of Class B common stock voting as a separate class;
- certain amendments to our restated certificate of incorporation or bylaws will require the approval of two-thirds of the combined vote of our then-outstanding shares of Class A and Class B common stock;
- at any time after our 2022 annual meeting of stockholders when the outstanding shares of our Class B common stock represent less than 40% of the total voting power of our common stock (the “Voting Threshold Date”), directors will be able to be removed only for cause and only by the affirmative vote of the holders of at least two-thirds of the voting power of our common stock;
- at any time after the Voting Threshold Date, our Board will be classified into three classes of directors with staggered three-year terms;
- at any time after the Vesting Threshold Date, subject to the rights of any series of preferred stock then outstanding, stockholders will no longer be able to act by written consent in lieu of a meeting; and
- our Board has the authority, without further action by our stockholders, to issue preferred stock in one or more series and to fix their designations, powers, preferences, privileges, and relative participating, optional, or special rights, and the qualifications, limitations, or restrictions, including dividend rights, conversion rights, voting rights, terms of redemption, and liquidation preferences, any or all of which may be greater than the rights associated with our Class A common stock.

Our amended and restated certificate of incorporation designates the Court of Chancery of the State of Delaware and federal court within the State of Delaware as the exclusive forum for certain types of actions and proceedings that our stockholders may initiate, which could limit a stockholder’s ability to obtain a favorable judicial forum for disputes with us or our directors, officers, or employees.

Our amended and restated certificate of incorporation provides that, subject to limited exceptions, the Court of Chancery of the State of Delaware and federal court within the State of Delaware will be exclusive forums for any:

- derivative action or proceeding brought on our behalf;
- action asserting a claim of breach of a fiduciary duty owed by any of our directors, officers, or other employees to us or our stockholders;
- action asserting a claim against us arising pursuant to any provision of the Delaware General Corporation Law, our amended and restated certificate of incorporation or bylaws; or
- other action asserting a claim against us that is governed by the internal affairs doctrine.

This choice of forum provision does not apply to actions brought to enforce a duty or liability created under the Exchange Act. Our amended and restated certificate of incorporation also provides that the federal district courts of the United States are the exclusive forum for the resolution of any complaint asserting a cause of action arising under the Securities Act. We intend for this provision to apply to any complaints asserting a cause of action under the Securities Act despite the fact that Section 22 of the Securities Act creates concurrent jurisdiction for the federal and state courts over all actions brought to enforce any duty or liability created by the Securities Act or the rules and regulations promulgated thereunder. There is uncertainty as to whether a court would enforce such a provision with respect to claims under the Securities Act, and our stockholders will not be deemed to have waived our compliance with the federal securities laws and the rules and regulations thereunder. Any person or entity purchasing or otherwise acquiring any interest in shares of our capital stock shall be deemed to have notice of and to have consented to the provisions of our amended and restated certificate of incorporation described above.

These choice of forum provisions may limit a stockholder’s ability to bring a claim in a judicial forum that it finds favorable for disputes with us or our directors, officers, or other employees, which may discourage such lawsuits against us and our directors, officers, and employees. Alternatively, if a court were to find these provisions of our amended and restated certificate of incorporation inapplicable to, or unenforceable in respect of, one or more of the specified types of actions or proceedings, we may incur additional costs associated with resolving such matters in other jurisdictions, which could adversely affect our business and financial condition.

The market price and trading volume of our common stock have been volatile and may continue to face negative pressure, including as a result of future sales or distributions of our common stock.

The U.S. stock markets, including Nasdaq, on which our common stock trades, have in the past and may in the future experience significant price and volume fluctuations. As a result, the market price of shares of our common stock has been similarly volatile, and investors in shares of our common stock have and may in the future experience a decrease in the value of their shares, including decreases unrelated to our operating performance or prospects. We cannot assure you that the market price of shares of our common stock will not fluctuate or decline significantly in the future.

In addition to the risks listed in this “Risk Factors” section, a number of factors could negatively affect the share price of our common stock or result in fluctuations in the price or trading volume of shares of our common stock, including:

- equity issuances by us, or future sales of substantial amounts of shares of our common stock by our existing or future stockholders, or the perception that such issuances or future sales may occur;
- increases in market interest rates;
- changes in market valuations of similar companies;
- fluctuations in stock market prices and volumes;
- additions or departures of key management personnel;
- our operating performance and the performance of our competitors;
- actual or anticipated differences in our quarterly operating results;
- changes in expectations of future financial performance;
- publication of research reports or media reports about us or our industry;
- adverse market reaction to any indebtedness we may incur;
- strategic decisions by us or our competitors, such as a potential transaction or acquisitions, divestments, spin offs, joint ventures, strategic investments, or changes in business strategy;
- the passage of legislation or other regulatory developments that adversely affect us or our industry;
- speculation in the press or investment community;
- changes in our earnings;
- our ability to satisfy the listing requirements of Nasdaq;

- failure to comply with the requirements of the Sarbanes-Oxley Act;
- actions by institutional or other significant stockholders;
- changes in accounting principles; and
- general market conditions, including factors unrelated to our performance.

In the past, securities class action litigation has been instituted against companies following periods of volatility in the price of their common stock. This type of litigation, which we currently face, may result in substantial costs and divert our management’s attention and resources, which could have a material adverse effect on our cash flows, our ability to execute our business strategy, and our ability to make distributions to our stockholders.

We rely on equity-based compensation to attract, retain, and motivate our executives and employees, which may result in stockholder dilution.

We rely upon equity awards, including stock option awards and restricted stock units, to attract and retain the key talent. During periods in which our share price declines, we may be required to issue equity awards covering a larger number of shares than anticipated to meet the current market level of compensation required to retain key executives and employees given the strong demand for talent in the technology industry. As a result, our share price may face incremental downward pressure as employees sell more shares into the market than anticipated. In addition, stockholders may experience additional dilution to the extent we are required to seek, and obtain, stockholder approval to expand the size of its employee equity incentive pool in order to maintain a competitive compensation position.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

Our corporate headquarters is located in San Diego, California, consisting of approximately 100,000 square feet of office space, including approximately 20,000 square feet of office space subleased or being offered for sublease. The office space is used primarily for corporate administration as well as research and development, pursuant to leases that expire in September 2027. In addition to our headquarters, we have also leased a number of our facilities in the U.S. and internationally, which are used by our U.S. and APAC segments, respectively. We believe that our office space is adequate for our current needs, and we believe that we will be able to obtain additional space on commercially reasonable terms if needed.

ITEM 3. LEGAL PROCEEDINGS

Except as described below, the Company believes it is not presently a party to any litigation the outcome of which, if determined adversely against the Company, would individually or in the aggregate have a material adverse effect on the Company’s business, financial condition, cash flows, or results of operations.

Shareholder Securities Litigation

On August 31, 2022, a securities class action (the “August 2022 Action”) complaint was filed, in the United States District Court for the Southern District of California, against the Company and certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through August 1, 2022. The August 2022 Action is captioned: *Dicker v. TuSimple Holdings, Inc. et al.*, 3:22-cv-01300-JES-MSB (S. D. Cal.). The complaint filed in the August 2022 Action alleges, among other things, that the Company and certain of its current and former directors and officers violated Sections 11 and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act by making materially false or misleading statements, or failing to disclose information it was required to disclose, regarding the Company’s autonomous driving technology. The complaint seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys’ fees.

On November 10, 2022, a second securities class action (the “November 2022 Action”) complaint was filed in the United States District Court for the Southern District of New York against the Company and certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Eric Tapia, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through October 31, 2022. The November 2022 Action was originally captioned: *Woldanski v. TuSimple Holdings, Inc., et al.*, 1:22-cv-09625-AKH (S.D.N.Y.). The complaint in the November 2022 Action alleges, among other things, that the Company and certain of its current and former directors and officers violated Sections 11, 12(a), and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act, by making false or misleading statements, or failing to disclose information it was required to disclose, regarding the Company’s related party transaction with Hydron, Inc. (“Hydron”) and the Company’s sharing of confidential information and proprietary technology with Hydron without approval from the Company’s board of directors. The complaint seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys’ fees. The November 2022 Action has since been transferred to the Southern District of California and is now captioned: *Woldanski v. TuSimple Holdings, Inc., et al.*, 3:23-cv-00282-JES-MSB (S. D. Cal.).

On May 3, 2023, the Company made a motion to consolidate the August 2022 Action and November 2022 Action. The Court granted the motion and consolidated the August 2022 Action and November 2022 Action on July 20, 2023. The plaintiffs have until October 2, 2023 to file a consolidated and amended complaint. The consolidated and amended complaint, and any future amended complaint, may include additional or alternate allegations regarding liability or alternate or additional claims for relief.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, lawsuit, which could be material.

Shareholder Derivative Actions

On November 28, 2022, a shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Brad Buss, Karen Francis, Michelle Sterling, and Reed Warner) alleging, among other things, that certain of the Company’s current and former directors and officers breached their fiduciary duties to the Company in connection with a related party transaction with Hydron: *Nusbaum v. Hou et al.*, 2022-1095-NAC (Del. Ch.). The shareholder derivative action also alleges breaches of fiduciary duties against certain of the Company’s current and former directors and officers in connection with the restructuring of the Company’s board of directors.

On December 15, 2022, a second shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Patrick Dillon, Eric Tapia, James Mullen, Brad Buss, Charles Chao, Karen Francis, Michelle Sterling, Reed Werner, and Bonnie Zhang) alleging similar claims to the action filed on November 28, 2022: *Young v. Hou et al.*, 2022-1157-NAC (Del. Ch.). The second shareholder derivative action additionally asserts, among other things, claims regarding the safety of the Company’s technology and alleged inadequacy of the Company’s internal controls.

On March 6, 2023, a third shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Brad Buss, Mo Chen, Charles Chao, Karen Francis, Wendy Hayes, Cheng Lu, James Lu, Michael Mosier, Michelle Sterling, Reed Werner, and Bonnie Zhang), alleging similar claims to the actions filed on November 28, 2022 and December 15, 2022: *Wolfson v. Hou et al.*, 2023-0279-NAC (Del. Ch.). The stockholder has since purported to voluntarily dismiss her action.

On March 29, 2023, the Company made a motion to consolidate all of the above shareholder derivative actions. The Court granted the motion and consolidated the shareholder derivative actions on May 5, 2023. A consolidated complaint was filed on July 24, 2023 against Xiaodi Hou, Mo Chen, Brad Buss, Karen C. Francis, Reed Werner, Hydron Inc., and TuSimple as nominal defendant, containing substantially the same claims as asserted in the complaint filed in *Nusbaum v. Hou et al.*, 2022-1095-NAC (Del. Ch.).

On August 17, 2023, the Delaware Court of Chancery entered an order staying the consolidated action through February 9, 2024, pending an investigation by a special litigation committee formed by the Company’s Board of Directors to assess and determine whether the pursuit of derivative claims asserted in the consolidated action would be in the Company’s best interests; the Board previously delegated to the SLC its authority to take all actions advisable, appropriate, and in the best interests of the Company and its shareholders with respect to the pending shareholder derivative litigation.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, lawsuit, which could be material.

Regulatory Investigations

Committee on Foreign Investments in the United States ("CFIUS")

The Company is cooperating with an inquiry by CFIUS concerning its compliance with the National Security Agreement ("NSA") entered into with the U.S. government as it relates to information shared by TuSimple U.S. with TuSimple's China-based businesses ("TuSimple China"), Hydron, and Hydron's partners. If CFIUS concludes that information shared with TuSimple China, Hydron, and Hydron's partners was shared in violation of the terms of the NSA, it may impose a civil penalty on the Company. At this time, the Company is unable to estimate the likelihood of a negative outcome or the potential loss or range of loss associated with this matter. The Audit Committee, the Government Security Committee of the Board (the "Government Security Committee"), the Board, and the Company are committed to cooperating fully as discussions with CFIUS continue.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, investigation, which could be material.

Securities and Exchange Commission ("SEC")

As disclosed on November 7, 2022, in connection with the filing of the Company's Current Report on Form 8-K regarding the initial findings of the Audit Committee's internal investigation into the related party transaction with Hydron, the Company proactively reached out to the SEC and received an initial request for information from the SEC. Since the initial outreach, the Company and certain current and former directors and officers received subpoenas from the SEC requesting the production of Company documents. The Company is unable to estimate the likelihood of a negative outcome or the potential loss or range of loss associated with this matter. The Company has cooperated, and intends to continue to fully cooperate, with the SEC's investigation.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, investigation, which could be material.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM 5. MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND ISSUER PURCHASES OF EQUITY SECURITIES

Market Information for Common Stock

Our Class A Common Stock has been listed on the Nasdaq Global Select Market under the symbol "TSP" since April 15, 2021. Prior to that date, there was no public trading market for our common stock.

Holders of our Common Stock

As of August 31, 2023, there were 13 holders of record of our Class A Common Stock and two holders of record of our Class B Common Stock. We believe the actual number of stockholders of our Class A Common Stock is greater than the corresponding number of record holders and includes stockholders who are beneficial owners but whose shares are held in street name by brokers and other nominees.

Dividend Policy

We have never declared or paid cash dividends on our capital stock. We intend to retain all available funds and future earnings, if any, to fund the development and expansion of our business, and we do not anticipate declaring or paying any cash dividends in the foreseeable future. The terms of certain of our outstanding debt instruments restrict our ability to pay dividends or make distributions on our common stock, and we may enter into credit agreements or other borrowing arrangements in the future that will restrict our ability to declare or pay cash dividends or make distributions on our capital stock. Any future determination regarding the declaration and payment of dividends, if any, will be at the discretion of our Board and will depend on then-existing conditions, including our financial condition, operating results, contractual restrictions, capital requirements, business prospects, and other factors our Board may deem relevant.

Securities Authorized for Issuance under Equity Compensation Plans

The following table provides certain information as of December 31, 2022 with respect to our existing equity compensation plans.

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights (#)	Weighted Average Exercise Price of Outstanding Options, Warrants and Rights ⁽²⁾ (\$)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans ⁽³⁾ (#)
Equity compensation plans approved by stockholders ⁽¹⁾	20,602,012	15.16	18,041,005
Equity compensation plans not approved by stockholders	—	—	—
Total	20,602,012	15.16	18,041,005

⁽¹⁾ All of our equity compensation plans have been approved by stockholders. This information is with respect to the 2017 Share Plan, the 2021 Equity Incentive Plan, and the 2021 Employee Stock Purchase Plan. The 2021 Equity Incentive Plan is the successor to and continuation of the 2017 Share Plan. As of the effective date of our initial public offering, no additional awards were to be granted under the 2017 Share Plan, but all stock awards granted under the 2017 Share Plan remain subject to their existing terms.

⁽²⁾ The weighted average exercise price does not take into account outstanding RSUs or share value awards, neither of which have exercise prices.

⁽³⁾ Included in this amount are 16,277,422 shares available for future issuance under our 2021 Equity Incentive Plan, and 1,763,583 shares available for future issuance under our 2021 Employee Stock Purchase Plan. No shares are available for issuance under our 2017 Share Plan.

Use of Proceeds

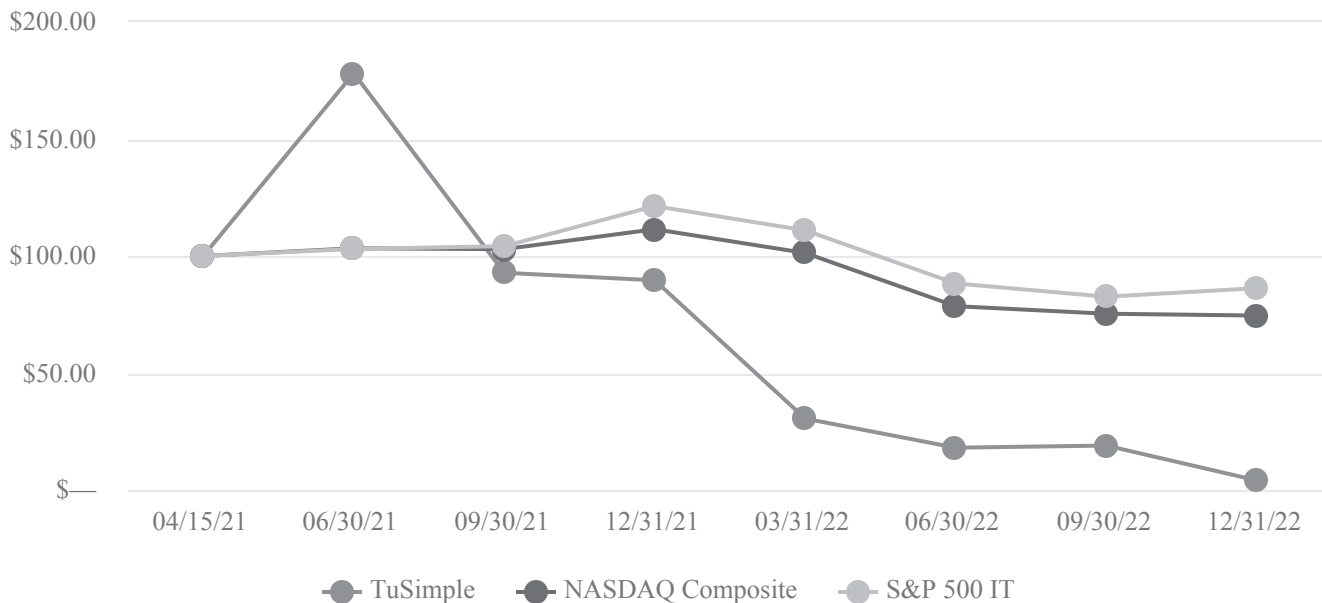
The Registration Statement on Form S-1 (File No. 333-254616) for the IPO was declared effective by the SEC on April 14, 2021. There has been no material change in the planned use of proceeds from the IPO from that described in the prospectus filed with the SEC pursuant to Rule 424(b)(4) under the Securities Act, as amended, on April 16, 2021.

Performance Graph

This performance graph shall not be deemed to be “filed” with the SEC for purposes of Section 18 of the Exchange Act, or otherwise subject to the liabilities under that Section, and shall not be deemed to be incorporated by reference into any filing of TuSimple Holdings Inc. under the Securities Act, or the Exchange Act.

The following graph compares the cumulative total return to stockholders on our Class A Common Stock relative to the cumulative total returns of the NASDAQ Composite Index and S&P 500 Information Technology Index. An investment of \$100 (with reinvestment of all dividends) is assumed to have been made in our Class A Common Stock and in each index on April 15, 2021, the date our common stock began trading on the Nasdaq Global Select Market, and its relative performance is tracked through December 31, 2022. The returns shown are based on historical results and are not indicative of, or intended to suggest, future performance.

Comparison of Cumulative Return for TuSimple, NASDAQ Composite Index and the S&P 500 Information Technology Index



ITEM 6. [Reserved]

ITEM 7. MANAGEMENT’S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS (“MD&A”)

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with the consolidated financial statements and the accompanying notes thereto included in Part II, Item 8, “Financial Statements and Supplementary Data” of this Annual Report on Form 10-K.

In addition to our historical consolidated financial information, the following discussion contains forward-looking statements that reflect our plans, estimates, and beliefs. Our actual results could differ materially from those discussed in the forward-looking statements. You should review the section titled “Special Note Regarding Forward-Looking Statements” for a discussion of forward-looking statements and in Part I, Item 1A, “Risk Factors,” for a discussion of factors that could cause actual results to differ materially from the results described in or implied by the forward-looking statements contained in the following discussion and analysis and elsewhere in this Annual Report on Form 10-K. Our historical results are not necessarily indicative of the results that may be expected for any period in the future.

Overview

When used in this report, the terms “TuSimple,” “Company,” “we,” “us,” and “our” mean TuSimple Holdings Inc. and all subsidiaries.

TuSimple is a global autonomous driving technology company headquartered in San Diego, California, with operations in the United States (“U.S.”) and Asia-Pacific region (“APAC”). Founded in 2015, we are working to revolutionize the estimated \$4 trillion global truck freight market by developing proprietary technologies that enable the scaled development and deployment of autonomous freight transportation. We believe that our full-stack L4 autonomous driving technology and our Autonomous Freight Network (“AFN”) will make global trucking safer as well as more reliable, efficient, and environmentally friendly.

Reportable Segments

TuSimple’s two reportable geographic segments are the U.S. and APAC. These segments align with our bifurcated development strategy of our L4 autonomous driving technology and independent operations and commercial business models in each region. Each segment has stand-alone engineering teams, software code base, infrastructure, technological capabilities, and onboard software development to fit regional demands and differences in end-market use cases.

AFN

We are in the early stages of developing our AFN in our key markets. Our AFN will provide autonomous freight capacity as a service through two service models based on users’ needs:

- ***TuSimple Capacity.*** Our fleet of owned or leased retrofitted (near-term) and purpose-built L4 autonomous semi-trucks (longer-term) will serve customers that desire access to safe, reliable, low cost, and more environmentally friendly freight transportation without owning semi-truck assets.
- ***Carrier-Owned Capacity.*** Customers that prefer to own their fleet will be able to purchase our purpose-built L4 autonomous semi-truck from an OEM with on-board autonomous driving software solutions.

For both the U.S. and APAC, we believe the TuSimple Capacity model with retrofitted trucks will enable an accelerated path to commercialization. We have developed proprietary technologies and systems necessary for the development and deployment of our autonomous trucking operations within the AFN. Once fully scaled, the AFN aims to serve as a comprehensive autonomous freight solution that provides users with access to L4 autonomous semi-trucks operating on HD digital mapped routes connecting a network of terminals.

Full-Stack L4 Autonomous Driving Technology, Hardware, and Offboard Capabilities

TuSimple is developing L4 autonomous driving solutions for the U.S. and APAC operations with Automated Driving System (“ADS”) L4 capable onboard software, offboard capabilities, and hardware. The capabilities for the U.S. and APAC segments, including their software base code, have been independently developed by the technology teams in each region.

Our autonomous driving technology is specifically designed for semi-trucks in the geographies where we operate. Our current development priorities and testing activities are focused on further refining our L4 autonomous driving technology to prepare them for scaled deployment and commercialization. Our proprietary L4 autonomous driving solutions include our L4-capable ADS, such as 1,000 meter perception range, multi-modal perception, and offboard capabilities, such as high definition (“HD”) maps, machine-learning, autonomy visualization and simulation capabilities, and an integrated L4 autonomous semi-truck design consisting of a redundant sensor suite, on-board computing solutions, and other components. Long-range perception, advanced planning and decision-making, and highly accurate mapping are important capabilities for the autonomous freight operation of semi-trucks, which are heavy, articulated vehicles that need to be able to operate at highway speeds.

Our Operations Today

We currently operate approximately seventy L4 autonomous semi-trucks, being 35 in the U.S. and 35 in APAC, in Driver In mode with a safety driver and safety engineer in the cabin and in commercial freight routes in Tucson, AZ (U.S.), Shanghai, China and Tokyo, Japan (APAC). Operating with a safety driver and safety engineer allows us to continually improve our L4 technology. We have also conducted select testing operations in other locations in the U.S., China, Japan and Sweden as we make Operating Design Domain (“ODD”) expansions and demonstrate capabilities to customers and partners. Currently, we do not have operations in Sweden.

During 2021 and 2022, we generated revenue from freight capacity services to customers via the TuSimple Capacity service model in the U.S. Gross loss margins for our revenue operations in 2021 and 2022 exceeded 100% of revenue given their developmental nature, including having a driver and test engineers in the trucks. Deploying our autonomous trucks in Driver In mode in a real world commercial setting allowed us to develop our technology while generating revenue, as well as establish fleet management operations and related processes well ahead of initiating commercialization. Currently, we believe the incremental benefits and learnings associated with these revenue operations do not outweigh their operating losses. Effective the fourth quarter of 2022, we de-emphasized revenue-generating freight services and started redeploying the respective resources and learnings to operate our trucks in “Driver-In” mode and in commercial freight routes but without providing freight services to customers. While we continue to work with select customers in some of our AFN routes, in 2023, we do not plan to generate significant revenue.

Recent Developments

Board and Management Changes

On October 30, 2022, the Company's Board terminated the employment of Dr. Xiaodi Hou as the Chief Executive Officer, President and Chief Technology Officer of the Company and removed Dr. Hou from his position as Chairman of the Board. The Board appointed Dr. Ersin Yumer as interim Chief Executive Officer and President of the Company, effective as of the same date.

On November 10, 2022, the Company received a written consent in which stockholders White Marble LLC, White Marble International Limited, Gray Jade Holding Limited, THC International Limited and Brown Jade Holding Limited, which together are the record holders of a majority of the voting power of the outstanding shares of capital stock of the Company, consented to the removal of Brad Buss, Karen C. Francis, Michelle Sterling and Reed Werner from the Company's Board. At such time, Dr. Hou became the sole remaining member of the Board and appointed Mo Chen and Cheng Lu to the Board.

On November 10, 2022, the Board (i) removed Dr. Yumer as interim Chief Executive Officer and President of the Company, (ii) appointed Cheng Lu as Chief Executive Officer of the Company, and (iii) appointed Mo Chen, as Executive Chairman of the Board, each effective immediately.

On December 7, 2022, James Lu was appointed to the Board as an independent director.

On December 15, 2022, Wendy Hayes and Michael Mosier were appointed to the Board as independent directors.

On March 9, 2023, Dr. Xiaodi Hou notified the Company that he was resigning from the Board, effective immediately.

On March 13, 2023, J. Tyler McGaughey and Zhen Tao were appointed to the Board as independent directors.

Restructuring

In December 2022 and May 2023, the Company announced several restructuring plans to streamline the U.S. operations, which included a 25% and 30% global workforce reduction, respectively. The restructuring charges associated with the December 2022 plan were recorded in the 2022 financial statements, while the May 2023 charges were recorded in the 2023 financial statements. For more information on these events, refer to:

- MD&A section below "Restructuring" for the December 2022 restructuring plan.
- Note 16. Subsequent Events to the consolidated financial statements included in Part II, Item 8, "Financial Statements and Supplementary Data," of this Annual Report on Form 10-K for the May 2023 restructuring plan.

Strategic Alternatives

On June 28, 2023, we announced that we are evaluating strategic alternatives for our U.S.-based business and engaged Perella Weinberg Partners as a financial advisor to explore possible transactions.

Operational Highlights

	As of December 31,		% Change
	2021	2022	
Research and Development ("R&D") Full Time Employees ("FTEs")	~1,100	~1,100	—%
Global FTEs	~1,400	~1,450 ^(a)	4%
Patents Issued	387	519	34%
Cumulative Road Miles (in thousands) ^(b)	~6,300	~10,000	59%
Total Truck Reservations (EOY) ^(c)	~6,975	~5,585	(20)%
Total Mapped Miles (EOY) ^(d)	~11,200	~11,400	2%
Revenue Miles (in thousands) ^{(e)(f)}	~3,446	~4,276	24%

(a) This global employee number includes U.S. employees that were part of an announced restructuring program dated December 2022 and employed at the time under the 60-day Worker Adjustment and Retraining Notification (WARN) relief program.

(b) Miles our autonomous trucks have run on open public roads.

(c) Total reservations for our purpose-built L4 semi-trucks.

(d) Cumulative unique miles on the AFN of which we have built a map compatible with our autonomous driving software.

(e) Miles our autonomous trucks have run during the years presented that generates revenues.

(f) Revenue miles for the year; non-cumulative and represent activity for the years ended December 31, 2021 and 2022.

The table above provides an update on operational highlights for the year ended December 31, 2022. The percentage changes represent year-over-year comparisons unless otherwise noted.

- Global FTEs increased 4% based on the number of employees prior to the December 2022 restructuring event. Including the restructuring events announced in December 2022 and May 2023 FTEs would have declined by more than 40% compared to December 31, 2021. Global headcount as of June 30, 2023, was approximately 800 employees.
- Patents Issued increased 34% as we continued to invest in our technology.
- Cumulative Road Miles driven and Total Mapped Miles increased 59% and 2%, respectively, to approximately 10.0 million and approximately 11,400, respectively, as of December 31, 2022, as we continued expansion of our AFN.
- Truck Reservations declined 20% due to cancellations.
- Revenue Miles increased 24% as a result of expanded routes and commercial partnerships.

The restructurings in December 2022 and May 2023 have streamlined the company's operations in the U.S. with the goal to continue maturing the company's technology in both the U.S. and APAC. We plan to focus on testing operations and R&D while de-emphasizing loss-making revenue operations. We do not expect to generate significant revenue in 2023, given our change in the U.S. fleet operations. As a result, we believe many of the KPIs listed above are no longer relevant to measure the progress of the company's goals and we will not be providing those metrics going forward.

In addition, we ended 2022 with \$615.4 million in cash and cash equivalents and \$377.3 million in short-term investments.

Components of Results of Operations

Revenue

To date, all of our revenue recognized has been from freight capacity services provided through the TuSimple Capacity service model in the U.S. Revenue is recognized over time as the goods are transported from one location to another based on the number of miles traveled. Shipments are completed within a short period of time, typically spanning one to two days.

Cost of Revenue

Our cost of revenue consists primarily of fuel costs, depreciation of property and equipment (including semi-trucks acquired under finance leases), labor costs, and other costs directly attributable to the provision of freight capacity services. Currently, we operate a large portion of our semi-trucks with two occupants, a safety engineer and a safety driver.

Research and Development

R&D costs consist primarily of personnel-related expenses, including stock-based compensation costs, associated with software developers and engineering personnel responsible for the design, development, and testing of our L4 autonomous driving technology, and allocated overhead costs.

Selling, General and Administrative ("SG&A")

SG&A costs consist primarily of personnel-related expenses, including stock-based compensation costs, associated with our sales, marketing, management and administration activities, professional service fees, and other general corporate expenses.

Change in Fair Value of Warrants Liability

The change in the fair value of warrants liability consists of the net changes in the fair value of our outstanding warrants to purchase redeemable convertible preferred stock that are remeasured at the end of each reporting period and upon their exercise. All outstanding warrants were exercised or expired during 2021 and we recorded one final remeasurement at fair value as of the exercise date.

Change in Fair Value of Related Party Convertible Loan

The change in the fair value of related party convertible loan consists of the net changes in the fair value of our related party convertible loan that was remeasured at the end of each reporting period and upon their redemption. The related party convertible loan was converted into Series E-1 redeemable convertible preferred stock during December 2020 and a final remeasurement was recorded as of the conversion date.

Gain on Loan Extinguishment

The gain on loan extinguishment recorded in 2021 was a result of the Paycheck Protection Program ("PPP") loan forgiveness by the lender. We expect this to be a one-time event.

Interest Income

Interest income consists primarily of interest earned on our cash and cash equivalents and short-term investments.

Provision for Income Taxes

Provision for income taxes consists primarily of U.S federal and state income taxes and income taxes in certain foreign jurisdictions in which we conduct business. Since inception, we have incurred operating losses. We have a full valuation allowance for net deferred tax assets, including federal and state net operating loss carryforwards and research and development credit carryforwards. We expect to maintain this valuation allowance until it becomes more likely than not that the benefit of our federal and state deferred tax assets will be realized by way of expected future taxable income.

Results of Operations

The following table sets forth our consolidated results of operations data for the periods presented (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Revenue	\$ 1,843	\$ 6,261	\$ 9,369
Cost of revenue	5,293	12,369	19,780
Gross loss	(3,450)	(6,108)	(10,411)
Operating expenses:			
Research and development ⁽¹⁾	132,001	287,167	351,599
Selling, general and administrative ⁽¹⁾	38,613	118,076	127,053
Total operating expenses	170,614	405,243	478,652
Loss from operations	(174,064)	(411,351)	(489,063)
Change in fair value of related party convertible loan	(5,556)	—	—
Change in fair value of warrants liability	1,816	(326,900)	—
Gain on loan extinguishment	—	4,183	—
Interest income	454	1,563	16,906
Other income (expense), net	(520)	(168)	112
Loss before provision for income taxes	(177,870)	(732,673)	(472,045)
Provision for income taxes	—	—	—
Net loss	(177,870)	(732,673)	(472,045)
Accretion of redeemable convertible preferred stock	(20,959)	(4,135)	—
Net loss attributable to common stockholders	\$ (198,829)	\$ (736,808)	\$ (472,045)

(1) Includes stock-based compensation expense as follows (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Research and development	\$ 917	\$ 71,201	\$ 75,260
Selling, general and administrative	11,846	51,395	23,407
Total stock-based compensation expense	\$ 12,763	\$ 122,596	\$ 98,667

Comparison of the Years Ended December 31, 2020, 2021, and 2022

Revenue

<i>(In thousands, except percentages)</i>	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Revenue	\$ 1,843	\$ 6,261	\$ 9,369	240 %	50 %

2020 compared to 2021. Revenue increased by \$4.5 million, or 240%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020, primarily due to growth in our business from an increase in paid miles through increased commercial utilization of TuSimple fleets and partners' fleets (brokerage) that supplement our capacity and increases in our rate per mile charged. During the year ended December 31, 2021, we expanded our revenue-miles by 153% from the year ended December 31, 2020 as a result of expanded routes and commercial partnerships.

2021 compared to 2022. Revenue increased by \$3.1 million, or 50%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to growth in our business from a higher number of revenue-generating trucks in TuSimple and partners' fleets, increases in revenue miles and rates per mile. During the year ended December 31, 2022, we expanded our revenue-miles by 24% from the year ended December 31, 2021 as a result of expanded routes and commercial partnerships.

Deploying our autonomous trucks in "Driver-In" mode in a real world commercial setting allowed us to develop our technology while generating revenue, as well as establish fleet management operations and related processes well ahead of initiating commercialization. Currently, we believe the incremental benefits and learnings associated with these revenue operations do not outweigh their operating losses. Effective the fourth quarter of 2022, we de-emphasized revenue-generating freight services and started redeploying the respective resources and learnings to operate our trucks in "Driver-In" mode and in commercial freight routes but without providing freight services to customers. While we continue to work with select customers in some of our AFN routes, in 2023 we do not plan to generate significant revenue.

Cost of Revenue

<i>(In thousands, except percentages)</i>	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Cost of Revenue	5,293	\$ 12,369	19,780	134 %	60 %

2020 compared to 2021. Cost of revenue increased by \$7.1 million, or 134%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020, primarily due to increased operating costs associated with the generation of revenue. Gross loss margin for the year ended December 31, 2021 was 98%, an improvement from the gross loss margin for the year ended December 31, 2020 of 187%. This improvement is a result of increased revenue-miles per truck, improved leverage through better fixed cost utilization, and an increase in the number of semi-trucks in our TuSimple fleet.

2021 compared to 2022. Cost of revenue increased by \$7.4 million, or 60%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to increased operating costs associated with the generation of revenue, including fuel costs, truck fleet operating costs, maintenance and driver compensation. Gross loss margin for the year ended December 31, 2022 was 111%, a slight deterioration from the gross loss margin for the year ended December 31, 2021 of 98%. This slight deterioration is attributable to increased fuel costs, maintenance, driver compensation, and truck insurance. As noted previously, effective the fourth quarter of 2022, we de-emphasized revenue-generating freight services and we do not expect to generate significant revenue and, therefore, cost of revenue in 2023.

Restructuring

During 2022, we incurred total charges of \$26.9 million (recorded in both SG&A and R&D expense) related to restructuring activities to rebalance our cost structure in alignment with our strategic priorities, including a 25% reduction of our total workforce and the impairment or write-off of several capital assets.

Research and Development

<i>(In thousands, except percentages)</i>	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
U.S.	\$ 105,118	\$ 214,754	\$ 257,011	104 %	20 %
APAC	26,883	72,413	94,588	169 %	31 %
Total R&D	\$ 132,001	\$ 287,167	\$ 351,599	118 %	22 %

U.S.

2020 compared to 2021. R&D expenses from our U.S. segment increased by \$109.6 million, or 104%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020. The increase was primarily attributable to an increase in personnel-related costs, including stock-based compensation costs, mainly driven by an increase in employee headcount in the ordinary course of business, depreciation and allocated facility costs, and purchases for equipment, supplies, and materials. The increase was partially offset by a one-time, non-cash charge related to the excess fair value of redeemable convertible preferred stock warrants issued over the cash proceeds received in conjunction with the issuance of shares of Series D-1 redeemable convertible preferred stock warrants to TRATON recorded in the year ended December 31, 2020.

2021 compared to 2022. R&D expenses from our U.S. segment increased by \$42.3 million, or 20%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The increase was primarily attributable to an increase in personnel-related costs, including stock-based compensation, mainly driven by an increase in employee headcount prior to our restructuring in December 2022, increased operational R&D costs associated with the development of our L4 autonomous trucking technology, offboard capabilities, and the upfitting and incremental testing of our global fleet assets, and costs associated with the December 2022 restructuring event.

APAC

2020 compared to 2021. R&D expenses from our APAC segment increased by \$45.5 million, or 169%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020. The increase was primarily attributable to an increase in personnel-related costs, including stock-based compensation costs, mainly driven by an increase in employee headcount in the ordinary course of business and a one-time charge of stock-based compensation costs incurred in connection with our IPO. The remainder of the increase was driven by increased operational R&D costs associated with the development of our L4 autonomous trucking technology and a higher number of semi-trucks in our fleet.

2021 compared to 2022. R&D expenses from our APAC segment increased by \$22.2 million, or 31%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The increase was primarily attributable to an increase in the purchases of equipment, supplies, and materials from a higher number of semi-trucks in our fleet, an increase in joint development costs related to the development of our TuSimple Domain Controller, and costs associated with the December 2022 restructuring event.

Selling, General and Administrative

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
U.S.	\$ 31,788	\$ 87,898	\$ 102,780	177 %	17 %
APAC	6,825	30,178	24,273	342 %	(20)%
Total SG&A	\$ 38,613	\$ 118,076	\$ 127,053	206 %	8 %

U.S.

2020 compared to 2021. SG&A expenses from our U.S. segment increased by \$56.1 million, or 177%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020. The increase was primarily attributable to an increase in personnel-related costs, including stock-based compensation, mainly driven by an increase in employee headcount, office, and facility-related costs, driven by the acquisition of director and officer insurance and the expansion of our facilities and operations, and accounting, legal, and other professional services costs driven by the expansion of our business processes and operational capabilities in-line with our status as a public reporting company.

2021 compared to 2022. SG&A expenses from our U.S. segment increased by \$14.9 million, or 17%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The increase was primarily driven by increased headcount in our commercial and administrative functions, as we expanded our business processes and operational capabilities in line with our status as a public reporting company, increased legal and professional services costs, due to ongoing litigation and investigations, operational facility expansions and costs associated with the December 2022 restructuring event.

APAC

2020 compared to 2021. SG&A expenses from our APAC segment increased by \$23.4, or 342%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020. The increase was primarily attributable to an increase in personnel-related costs, including stock-based compensation, mainly driven by an increase in employee headcount in the ordinary course of business and a one-time charge of stock-based compensation costs incurred in connection with the IPO.

2021 compared to 2022. SG&A expenses from our APAC segment decreased by \$5.9 million, or 20%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021. The decrease was primarily attributable to a decrease in personnel-related costs, mainly due to the one-time charge of stock-based compensation incurred in the year ended December 31, 2021 associated with our IPO. The decrease was partially offset by an increase in office and facility-related costs.

Change in Fair Value of Related Party Convertible Loan

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Change in Fair Value of Related Party Convertible Loan	\$ (5,556)	\$ —	\$ —	*	*

* Percentage not meaningful

Loss from the change in fair value of related party convertible loan of \$5.6 million in the year ended December 31, 2020 was driven by the remeasurement of the related party convertible loan at fair value each period until its conversion into Series E-1 redeemable convertible preferred stock during December 2020. There were no such outstanding convertible loans in the years ended December 31, 2021 or 2022.

Change in Fair Value of Warrants Liability

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Change in fair value of warrants liability	\$ 1,816	\$ (326,900)	\$ —	*	*

* Percentage not meaningful

Change in fair value of warrants liability of \$1.8 million and \$326.9 million for the years ended December 31, 2020 and 2021, respectively, was driven by the remeasurement of redeemable convertible preferred stock warrants at fair value immediately prior to their exercise dates during the period. As of December 31, 2021 and 2022, there were no warrants outstanding.

Gain on Loan Extinguishment

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Gain on loan extinguishment	\$ —	\$ 4,183	\$ —	*	*

* Percentage not meaningful

Gain on loan extinguishment of \$4.2 million for the year ended December 31, 2021 was driven by the forgiveness of the PPP loan by the lender.

Interest Income

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Interest income	\$ 454	\$ 1,563	16,906	244 %	982 %

2020 compared to 2021. Interest income increased by \$1.1 million, or 244%, in the year ended December 31, 2021 as compared to the year ended December 31, 2020, primarily due to interest income earned on money market funds.

2021 compared to 2022. Interest income increased by \$15.3 million, or 982%, in the year ended December 31, 2022 as compared to the year ended December 31, 2021, primarily due to interest income earned on money market funds and short-term investments.

Key Metric and Non-GAAP Financial Measure

(In thousands, except percentages)	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
Loss from operations	\$ (174,064)	\$ (411,351)	\$ (489,063)	136 %	19 %
Adjusted EBITDA ⁽¹⁾	(153,285)	(278,887)	(348,653)	82 %	25 %

⁽¹⁾ Adjusted EBITDA is a non-GAAP financial measure. For more information regarding our use of this financial measure and a reconciliation of this financial measure to the most comparable GAAP measure, see "Reconciliation of Non-GAAP Financial Measure."

Adjusted EBITDA

Adjusted EBITDA is a performance measure that our management uses to assess our operating performance in our business. Since Adjusted EBITDA facilitates internal comparisons of our historical operating performance on a more consistent basis, we use this measure for business planning purposes. Accordingly, we believe that Adjusted EBITDA provides useful information to investors and others in understanding and evaluating our operating results in the same manner as our management team and board of directors.

We calculate Adjusted EBITDA as loss from operations, adjusted to exclude:

- depreciation and amortization;
- stock-based compensation expense;
- restructuring expenses; and
- finance lease interest expense included within cost of sales.

For more information regarding the limitations of Adjusted EBITDA and a reconciliation of loss from operations to Adjusted EBITDA, see the section titled "Reconciliation of Non-GAAP Financial Measure."

Reconciliation of Non-GAAP Financial Measure

We use Adjusted EBITDA in conjunction with GAAP measures as part of our overall assessment of our performance, including the preparation of our operating budget and quarterly forecasts, to evaluate the effectiveness of our business strategies, and to communicate with our Board concerning our financial performance. Because non-GAAP financial measures are not standardized, it may not be possible to compare this measure with other companies' non-GAAP measures having the same or similar names. In addition, other companies may not publish similar metrics. Furthermore, this measure has certain limitations in that it does not include the impact of certain expenses that are reflected in our consolidated statements of operations that are necessary to run our business. Thus, our Adjusted EBITDA should be considered in addition to, not as a substitute for, or in isolation from, measures prepared in accordance with GAAP.

The following table provides a reconciliation of reported loss from operations determined in accordance with GAAP to non-GAAP adjusted EBITDA (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Loss from operations	\$ (174,064)	\$ (411,351)	\$ (489,063)
Stock-based compensation expense ⁽¹⁾	12,763	122,596	101,718
Depreciation and amortization ⁽¹⁾	7,683	9,450	11,264
Restructuring expenses	—	—	26,855
Interest expense	333	418	573
Adjusted EBITDA	<u>\$ (153,285)</u>	<u>\$ (278,887)</u>	<u>\$ (348,653)</u>

⁽¹⁾ Excludes amounts related to restructuring events.

Segment Adjusted EBITDA

We have two reportable segments: U.S. and APAC. Our chief of decision maker ("CODM") utilizes the segment Adjusted EBITDA to evaluate operating performance and allocate resources.

The following table provides information about our segment Adjusted EBITDA (in thousands):

	Year Ended December 31,			2020 to 2021 % Change	2021 to 2022 % Change
	2020	2021	2022		
U.S.	\$ (124,314)	\$ (220,370)	\$ (259,109)	77 %	18 %
APAC	(28,971)	(58,517)	(89,544)	102 %	53 %
Total Adjusted EBITDA	<u>\$ (153,285)</u>	<u>\$ (278,887)</u>	<u>\$ (348,653)</u>		

The changes in our segment Adjusted EBITDA for both U.S. and APAC segments are primarily attributable to the changes in operating expenses. Refer to the section titled "Comparison of the Years Ended December 31, 2020, 2021, and 2022" above for discussion on the changes in respective research and development expense and selling, general and administrative expense for the two segments.

Liquidity and Capital Resources

We have financed our operations primarily through the sale of capital stock, which has historically been sufficient to meet our working capital and capital expenditure requirements. As of December 31, 2022, our principal sources of liquidity were \$615.4 million of cash and cash equivalents, exclusive of restricted cash of \$2.1 million, and \$377.3 million of short-term investments. Cash and cash equivalents consist primarily of cash on deposit with banks, certificates of deposit, and money market funds. Short-term investments consist primarily of available-for-sale debt securities including: commercial paper, U.S. treasury securities, U.S. government agency securities, and corporate debt securities. We consider our short-term investments as available for use in current operations. Based on our current operating plan, we believe that our existing cash and cash equivalents and anticipated cash generated from sales of our services, will be sufficient to meet our anticipated cash needs for at least the next 12 months.

Our future capital requirements will depend on many factors, including, but not limited to, the rate of our growth, our ability to attract and retain users and their willingness to pay for our services, and the timing and extent of spending to support our efforts to develop our L4 autonomous driving technology and AFN. Further, we may enter into future arrangements to acquire or invest in businesses, products, services, strategic partnerships, and technologies. As such, we may be required to seek additional equity and/or debt financing. To the extent that we raise additional capital through the sale of equity or convertible debt securities, the ownership interest of our stockholders will be diluted, and the terms of these securities may include liquidation or other preferences that adversely affect the rights of common stockholders. The incurrence of indebtedness would result in increased fixed obligations and could result in operating covenants that would restrict our operations. If we are unable to maintain sufficient financial resources, our business, financial condition, and results of operations may be materially and adversely affected.

Cash Flows

The following table summarizes our cash flows for the periods presented (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Net cash (used in) provided by:			
Operating activities	\$ (103,848)	\$ (259,033)	\$ (329,865)
Investing activities	(4,412)	(13,637)	(392,173)
Financing activities	356,495	1,299,151	1,394

Operating Activities

Net cash used in operating activities was \$103.8 million, \$259.0 million, and \$329.9 million for the years ended December 31, 2020, 2021, and 2022, respectively. The increase was primarily due to an increase in loss from operations as we continue to operate, develop, and expand our AFN and L4 autonomous driving technology, grow our research and development and support personnel, and incur incremental expenses associated with being a public company.

Investing Activities

Net cash used in investing activities was \$4.4 million, \$13.6 million, and \$392.2 million for the years ended December 31, 2020, 2021, and 2022, respectively, as we continue to invest in technological assets and equipment, and as we started to invest in marketable securities during 2022.

Additionally, non-cash acquisitions of property and equipment included in liabilities were \$2.8 million, \$10.5 million, and \$3.3 million for the years ended December 31, 2020, 2021, and 2022, respectively.

Financing Activities

Net cash provided by financing activities was \$356.5 million for the year ended December 31, 2020, as we received proceeds from the issuance of redeemable convertible preferred stock of \$291.7 million, proceeds from the issuance of a related party convertible loan of \$50.0 million, proceeds from the issuance of redeemable convertible preferred stock warrants of \$11.9 million, proceeds from related party loans of \$5.0 million, proceeds from the Small-Business Administration Paycheck Protection Program (“PPP”) loans of \$4.1 million, and proceeds of \$2.5 million from the exercise of warrants for Series D-1 redeemable convertible preferred stock. These were partially offset by principal payments on related party loans of \$7.9 million.

Net cash provided by financing activities was \$1.3 billion for the year ended December 31, 2021 as we received significant proceeds from the sale of Class A common stock in our IPO and concurrent private placement of \$1.0 billion, proceeds from the exercise of warrants for redeemable convertible preferred stock of \$183.0 million, and net proceeds from the issuance of redeemable convertible preferred stock of \$54.7 million.

Net cash provided by financing activities was \$1.4 million for the year ended December 31, 2022 related to proceeds received from the issuance of shares related to the exercise of stock options by employees and purchases under our Employee Stock Purchase Plan, offset by the principal payments on our truck purchase loans.

Material Cash Requirements

As of December 31, 2022, there were future minimum lease payments of \$4.1 million and \$59.3 million for finance and operating leases, respectively.

Critical Accounting Estimates

We prepare our consolidated financial statements in accordance with accounting principles generally accepted in the U.S. (“GAAP”). The preparation of these consolidated financial statements in conformity with GAAP requires us to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. We base our estimates on historical experience and other assumptions that we believe are reasonable under the circumstances. Our actual results could differ significantly from these estimates under different assumptions and conditions. We believe that the accounting policies discussed below are critical to understanding our historical and future performance as these policies involve a greater degree of judgment and complexity.

Stock-Based Compensation

We account for stock-based compensation expense in accordance with the fair value recognition and measurement provisions of GAAP, which requires compensation cost for the grant-date fair value of stock-based awards to be recognized over the requisite service period. We determine the fair value of stock-based awards granted or modified on the grant date (or modification date, if applicable) at fair value, using appropriate valuation techniques.

Time-Based Service Awards

For stock-based awards with time-based vesting conditions only, generally being restricted stock units (“RSUs”) and stock options, stock-based compensation is recognized straight-line over the requisite service period, which is generally four years. The fair value of RSUs is measured on the grant date based on the fair value of the underlying common stock. The fair value of stock option awards is estimated on the grant date using the Black-Scholes option-pricing model. The Black-Scholes option-pricing model requires the input of highly subjective assumptions, including the fair value of the underlying common stock, the expected stock price volatility over the term of the award, actual and projected employee stock option exercise behaviors, the risk-free interest rate for the expected term of the award, and expected dividends. We account for forfeitures as they occur instead of estimating the number of awards expected to be forfeited.

Performance-Based Awards

We have granted RSUs, share value awards (“SVAs”), and stock options that vest only upon the satisfaction of both time-based service and performance-based conditions. The time-based service condition for these awards generally is satisfied over four years. The performance-based conditions, other than with respect to the 2021 CEO Performance Award discussed in Note 10. Stock-Based Compensation to the consolidated financial statements included in Part II, Item 8, “*Financial Statements and Supplementary Data*,” of this Annual Report on Form 10-K, are satisfied upon the occurrence of a qualifying event, defined as the earlier of (i) the closing of certain specific liquidation or change in control transactions, or (ii) an IPO. We record stock-based compensation expense for performance-based equity awards such as RSUs, SVAs, and stock options on an accelerated attribution method over the requisite service period, which is generally four years, and only if performance-based conditions are considered probable to be satisfied. Upon completion of the IPO, we recorded a cumulative one-time stock-based compensation expense determined using the grant-date fair values. Stock-based compensation related to remaining time-based service after the qualifying event is recorded over the remaining requisite service period. For performance-based RSUs and SVAs, we determine the grant-date fair value as the fair value of our common stock on the grant date. For performance-based stock options, we determine the grant-date fair value using the Black-Scholes option-pricing model described above.

For the 2021 CEO Performance Award with a vesting schedule based entirely on the attainment of both performance and market conditions, stock-based compensation expense associated with each tranche is recognized over the longer of (i) the expected achievement period for the operational milestones for such tranche and (ii) the expected achievement period for the related market capitalization milestone determined on the grant date, beginning at the point in time when the relevant operational milestones are considered probable of being met. If such operational milestones become probable any time after the grant date, we will recognize a cumulative catch-up expense from the grant date to that point in time. If the related market capitalization milestone is achieved earlier than its expected achievement period, then the stock-based compensation expense will be recognized over the expected achievement period for the operational milestones, which may accelerate the rate at which such expense is recognized. The fair value of such awards is estimated on the grant date using Monte Carlo simulations. Refer to Note 10. Stock-Based Compensation to the consolidated financial statements included in Part II, Item 8, “*Financial Statements and Supplementary Data*,” of this Annual Report on Form 10-K for further information.

Market-Based Awards

For the 2022 CEO Award with a vesting schedule based on the satisfaction of both time-based service and market-based conditions, we determine the grant-date fair value utilizing Monte Carlo simulations. Stock-based compensation expense associated with each tranche is recognized over the longer of (i) the expected achievement period for the market milestones and (ii) the explicit service-based period. Refer to Note 10. Stock-Based Compensation to the consolidated financial statements included in Part II, Item 8, "*Financial Statements and Supplementary Data*," of this Annual Report on Form 10-K for further information.

JOBS Act Accounting Election

We were previously an emerging growth company, as defined in the Jumpstart Our Business Startups (JOBS) Act. The JOBS Act permits an emerging growth company to take advantage of an extended transition period to comply with new or revised accounting standards applicable to public companies. On June 30, 2022, the last business day of the Company's second fiscal quarter in 2022, the market value of the Company's common stock held by non-affiliates exceeded \$700 million. Accordingly, the Company was deemed a large-accelerated filer as of December 31, 2022, and can no longer take advantage of the extended timeline to comply with new or revised accounting standards applicable to public companies, beginning with this Annual Report on Form 10-K.

Recent Accounting Pronouncements

For information on recently issued accounting pronouncements, refer to Note 1. Description of Business and Summary of Significant Accounting Policies of Part II, Item 8. "*Financial Statements and Supplementary Data*." of this Annual Report on Form 10-K.

ITEM 7A. QUALITATIVE AND QUANTITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risks in the ordinary course of our business, which primarily relate to fluctuations in foreign exchange rates.

Foreign Currency Exchange Risk

The functional currency of our foreign subsidiaries is the local currency or U.S. dollar depending on the nature of the subsidiaries' activities. Foreign currency transactions recognized in the consolidated statements of operations are converted to the functional currency by applying the exchange rate prevailing on the date of the transaction. Our results of operations and cash flows are subject to fluctuations due to changes in foreign currency exchange rates. During the years ended December 31, 2021 and 2022, we recorded other comprehensive income of \$0.4 million and other comprehensive loss of \$1.3 million, respectively, in connection with the the foreign currency translation adjustment. The effect of a hypothetical 10% change in foreign currency exchange rates applicable to our business would not have had a material impact on our historical consolidated financial statements for the years ended December 31, 2021 and 2022. As the impact of foreign currency exchange rates has not been material to our consolidated financial statements, we have not engaged in any foreign currency hedging strategies. As our international operations grow, we will continue to reassess our approach to manage our risk relating to fluctuations in currency rates.

Investment and Interest Rate Risk

We are exposed to interest rate risk related primarily to our investment portfolio. Changes in interest rates affect the interest earned on our total cash, cash equivalents, and marketable securities and the fair value of those securities.

We had cash and cash equivalents of \$615.4 million and short-term investments of \$377.3 million as of December 31, 2022, which primarily consisted of cash in banks and highly-liquid investments with original maturities of three months or less. The primary objective of our investment activities is to preserve capital and meet liquidity requirements without significantly increasing risk. We invest primarily in highly-liquid, investment grade debt securities, and we limit the amount of credit exposure to any one issuer. We do not enter into investments for trading or speculative purposes and have not used any derivative financial instruments to manage our interest rate risk exposure. Because our cash equivalents and marketable securities generally have short maturities, the fair value of our portfolio is relatively insensitive to interest rate fluctuations. Due to the short-term nature of our investments, we have not been exposed to, nor do we anticipate being exposed to, material risks due to changes in interest rates. A hypothetical 100 basis point increase in interest rates would not have a material impact on the fair value of our investment portfolio as of December 31, 2022.

ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

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Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of TuSimple Holdings, Inc.

Opinion on the Consolidated Financial Statements

We have audited the accompanying consolidated balance sheets of TuSimple Holdings, Inc. and its subsidiaries (the “Company”) as of December 31, 2022 and 2021, and the related consolidated statements of operations and other comprehensive loss, redeemable convertible preferred stock and stockholders’ equity (deficit), and cash flows for each of the years in the three-year period ended December 31, 2022, and the related notes (collectively referred to as the consolidated financial statements). In our opinion, the consolidated financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2022 and 2021, and the results of its operations and its cash flows for each of the years in the three-year period ended December 31, 2022, in conformity with accounting principles generally accepted in the United States of America.

We have also audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the Company’s internal control over financial reporting as of December 31, 2022, based on criteria established in Internal Control—Integrated Framework (2013) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO), and our report dated September 7, 2023, expressed an adverse opinion.

Change in Accounting Principle

As discussed in Note 1 to the consolidated financial statements, the Company changed its method of accounting for leases as of January 1, 2022 due to the adoption of Accounting Standards Codification (“ASC”) Topic 842, Leases, and its method of accounting for credit losses as of January 1, 2022, due to the adoption of ASC Topic 326, Financial Instruments—Credit Losses.

Basis for Opinion

These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on the Company’s consolidated financial statements based on our audits. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audits to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the consolidated financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the consolidated financial statements. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements. We believe that our audits provide a reasonable basis for our opinion.

Critical Audit Matters

Critical audit matters are matters arising from the current period audit of the consolidated financial statements that were communicated or required to be communicated to the audit committee and that (1) relate to accounts or disclosures that are material to the consolidated financial statements and (2) involved our especially challenging, subjective, or complex judgments. We determined that there were no critical audit matters.

/s/ UHY LLP

We have served as the Company’s auditor since 2023.

Irvine, California

September 7, 2023

Report of Independent Registered Public Accounting Firm

To the Board of Directors and Stockholders of TuSimple Holdings, Inc.

Adverse Opinion on Internal Control over Financial Reporting

We have audited TuSimple Holdings, Inc. and its subsidiaries' (the Company's) internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). In our opinion, because of the effect of the material weaknesses described in the following paragraph on the achievement of the objectives of the control criteria, the Company has not maintained effective internal control over financial reporting as of December 31, 2022, based on criteria established in *Internal Control—Integrated Framework (2013)* issued by COSO.

A material weakness is a control deficiency, or a combination of deficiencies, in internal control over financial reporting, such that there is a reasonable possibility that a material misstatement of the Company's annual or interim financial statements will not be prevented or detected on a timely basis. The following two material weaknesses have been identified and included in management's assessment:

- The Company did not maintain effective controls over the disclosure of related party transactions resulting from a lack of understanding among Company personnel regarding the Company's policy on the identification, approval, and disclosure of related party transactions.
- The Company's oversight and monitoring of required internal controls and procedures was impacted due to the unexpected removal of all independent directors of its Board in November 2022, including all of the members of its Audit Committee, by its controlling shareholders.

These material weaknesses were considered in determining the nature, timing, and extent of audit procedures applied during our audit of the 2022 consolidated financial statements, and this report does not affect our report dated September 7, 2023, on those financial statements.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States) (PCAOB), the consolidated balance sheets and the related consolidated statements of operations and other comprehensive loss, redeemable convertible preferred stock and stockholders' equity (deficit), and cash flows of the Company, and our report dated September 7, 2023, expressed an unqualified opinion.

Basis for Opinion

The Company's management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting, included in the accompanying Management's Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit. We are a public accounting firm registered with the PCAOB and are required to be independent with respect to the Company in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audit in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit of internal control over financial reporting included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. Our audit also included performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

Definition and Limitations of Internal Control over Financial Reporting

A company's internal control over financial reporting is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

/s/ UHY LLP

Irvine, California

September 7, 2023

TuSimple Holdings, Inc.
Consolidated Balance Sheets
(in thousands, except share data)

	December 31,	
	2021	2022
Assets		
Current assets:		
Cash and cash equivalents	\$ 1,337,586	\$ 615,386
Short-term investments	—	377,312
Accounts receivable, net	1,599	1,377
Prepaid expenses and other current assets	13,995	13,477
Total current assets	1,353,180	1,007,552
Property and equipment, net	36,053	17,083
Operating lease right-of-use assets	—	44,952
Other assets	7,090	4,692
Total assets	<u>\$ 1,396,323</u>	<u>\$ 1,074,279</u>
Liabilities and Stockholders' Equity		
Current liabilities:		
Accounts payable	\$ 4,544	\$ 9,855
Amounts due to joint development partners	7,394	5,753
Accrued expenses and other current liabilities	41,698	48,260
Short-term debt	1,524	1,645
Capital lease liabilities, current	766	—
Operating lease liabilities, current	—	6,007
Total current liabilities	55,926	71,520
Capital lease liabilities, noncurrent	2,872	—
Operating lease liabilities, noncurrent	—	42,169
Long-term debt	5,543	3,668
Other liabilities	5,004	2,441
Total liabilities	69,345	119,798
Commitments and contingencies (Note 8)		
Stockholders' equity:		
Preferred stock, \$0.0001 par value; 100,000,000 shares authorized as of December 31, 2021 and 2022; zero shares issued and outstanding as of December 31, 2021 and 2022	—	—
Common Stock, \$0.0001 par value, 4,876,000,000 Class A shares authorized as of December 31, 2021 and 2022; 197,833,195 and 201,707,557 Class A shares issued and outstanding as of December 31, 2021 and 2022, respectively; 24,000,000 Class B shares authorized, issued and outstanding as of December 31, 2021 and 2022, respectively	22	22
Additional paid-in capital	2,464,730	2,567,723
Accumulated other comprehensive income (loss)	77	(3,559)
Accumulated deficit	(1,137,851)	(1,609,705)
Total stockholders' equity	1,326,978	954,481
Total liabilities and stockholders' equity	<u>\$ 1,396,323</u>	<u>\$ 1,074,279</u>

The accompanying notes are an integral part of these consolidated financial statements.

TuSimple Holdings, Inc.
Consolidated Statements of Operations
(in thousands, except share and per share data)

	Year Ended December 31,		
	2020	2021	2022
Revenue	\$ 1,843	\$ 6,261	\$ 9,369
Cost of revenue	5,293	12,369	19,780
Gross loss	(3,450)	(6,108)	(10,411)
Operating expenses:			
Research and development	132,001	287,167	351,599
Selling, general and administrative	38,613	118,076	127,053
Total operating expenses	170,614	405,243	478,652
Loss from operations	(174,064)	(411,351)	(489,063)
Change in fair value of related party convertible loan	(5,556)	—	—
Change in fair value of warrants liability	1,816	(326,900)	—
Gain on loan extinguishment	—	4,183	—
Interest income	454	1,563	16,906
Other income (expense), net	(520)	(168)	112
Loss before provision for income taxes	(177,870)	(732,673)	(472,045)
Provision for income taxes	—	—	—
Net loss	(177,870)	(732,673)	(472,045)
Accretion of redeemable convertible preferred stock	(20,959)	(4,135)	—
Net loss attributable to common stockholders	\$ (198,829)	\$ (736,808)	\$ (472,045)
Net loss per share attributable to common stockholders, basic and diluted	\$ (3.37)	\$ (4.36)	\$ (2.11)
Weighted-average shares used in computing net loss per share attributable to common stockholders, basic and diluted	58,929,271	169,080,392	224,164,514

The accompanying notes are an integral part of these consolidated financial statements.

TuSimple Holdings, Inc.
Consolidated Statements of Comprehensive Loss
(in thousands)

	Year Ended December 31,		
	2020	2021	2022
Net loss	\$ (177,870)	\$ (732,673)	\$ (472,045)
Other comprehensive income (loss), net of tax:			
Unrealized net loss on available-for-sale securities	—	—	(2,298)
Foreign currency translation adjustment	401	378	(1,338)
Comprehensive loss	(177,469)	(732,295)	(475,681)

The accompanying notes are an integral part of these consolidated financial statements.

TuSimple Holdings Inc.
Consolidated Statements of Redeemable Convertible Preferred Stock and Stockholders' Equity (Deficit)
(in thousands, except share data)

	Redeemable Convertible Preferred Stock		Common Stock		Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)		Total TuSimple Holdings, Inc. Stockholders' Equity (Deficit)	Noncontrolling Interests	Total Stockholders' Equity (Deficit)
	Shares	Amount	Shares	Amount		Amount	Amount			
Balance as of December 31, 2019	74,939,388	\$293,736	56,516,425	\$ 6	\$ —	\$ (658)	\$ (218,718)	\$ (44)	\$ (219,414)	
Issuance of Series D-1 redeemable convertible preferred shares, net of issuance costs	1,854,177	3,098	—	—	—	—	—	—	—	
Reclassification of Series D-1 redeemable convertible preferred share warrants from equity to liabilities	—	—	—	—	(394)	—	—	(394)	—	
Issuance of Series D-1 redeemable convertible preferred shares from the exercise of warrants	308,182	2,894	—	—	—	—	—	—	—	
Issuance of Series E redeemable convertible preferred shares, net of issuance costs	21,044,019	288,548	—	—	—	—	—	—	—	
Conversion of related party convertible loan to Series E-1 redeemable convertible preferred shares	3,928,937	55,556	—	—	—	—	—	—	—	
Issuance of ordinary shares from exercise of options	—	—	2,127,232	—	—	—	—	—	—	
Issuance of restricted ordinary shares	—	—	1,899,680	—	—	—	—	—	—	
Accretion of redeemable convertible preferred shares to redemption value	—	20,959	—	—	(12,369)	—	(8,590)	(20,959)	(20,959)	
Share-based compensation	—	—	—	—	12,763	—	—	12,763	12,763	
Acquisition of noncontrolling interest in subsidiary	—	—	—	—	—	(44)	—	(44)	44	
Foreign currency translation adjustment	—	—	—	—	—	401	—	401	401	
Net loss	—	—	—	—	—	—	(177,870)	—	(177,870)	
Balance as of December 31, 2020	102,074,703	664,791	60,543,337	6	—	(301)	(405,178)	(405,473)	(405,473)	
Issuance of Series E redeemable convertible preferred Stock, net of issuance costs	4,650,999	61,631	—	—	—	—	—	—	—	
Issuance of Series E redeemable convertible preferred Stock from exercise of warrants	9,477,073	379,084	—	—	—	—	—	—	—	
Issuance of Series E-2 redeemable convertible preferred Stock from exercise of warrants	4,331,644	173,275	—	—	—	—	—	—	—	
Accretion of redeemable convertible preferred stock to redemption value	—	4,135	—	—	(4,135)	—	—	(4,135)	(4,135)	
Conversion of redeemable convertible preferred stock to common stock in connection with initial public offering	(120,534,419)	(1,282,916)	120,534,419	12	1,282,904	—	—	1,282,916	1,282,916	

Issuance of common stock in connection with initial public offering, net of offering costs	27,027,027	3	1,027,371	—	—	1,027,374	—	1,027,374
Issuance of common stock related to private placement	874,999	—	35,000	—	—	35,000	—	35,000
Issuance of common stock from exercise of options	8,580,984	1	910	—	—	911	—	911
Issuance of common stock related to release of RSUs and SVAs	4,272,429	—	—	—	—	—	—	—
Vesting of early exercised stock options	—	—	84	—	—	84	—	84
Stock-based compensation	—	—	122,596	—	—	122,596	—	122,596
Foreign currency translation adjustment	—	—	—	378	—	378	—	378
Net loss	—	—	—	—	(732,673)	(732,673)	—	(732,673)
Balance as of December 31, 2021	221,833,195	22	2,464,730	77	(1,137,851)	1,326,978	—	1,326,978
Adjustments for prior periods from adopting ASC 842	—	—	—	—	191	191	—	191
Issuance of common stock from exercise of options	980,696	—	1,872	—	—	1,872	—	1,872
Issuance of common stock from release of RSUs and SVAs	2,643,835	—	—	—	—	—	—	—
Issuance of common stock under the Employee Stock Purchase Plan	249,831	—	2,286	—	—	2,286	—	2,286
Vesting of early exercised stock options	—	—	168	—	—	168	—	168
Stock-based compensation	—	—	98,667	—	—	98,667	—	98,667
Unrealized loss on available-for-sale debt securities, net	—	—	—	(2,298)	—	(2,298)	—	(2,298)
Foreign currency translation adjustment	—	—	—	(1,338)	—	(1,338)	—	(1,338)
Net loss	—	—	—	—	(472,045)	(472,045)	—	(472,045)
Balance as of December 31, 2022	225,707,557	22	\$2,567,72	\$ (3,559)	\$ (1,609,71)	\$ 954,481	\$ —	\$ 954,481

The accompanying notes are an integral part of these consolidated financial statements

TuSimple Holdings, Inc.
Consolidated Statements of Cash Flows
(in thousands)

	Year Ended December 31,		
	2020	2021	2022
Cash flows from operating activities:			
Net loss	\$ (177,870)	\$ (732,673)	\$ (472,045)
Adjustments to reconcile net loss to net cash used in operating activities			
Share-based compensation	12,763	122,596	98,667
Depreciation and amortization	7,683	9,450	27,555
Noncash operating lease expense	—	—	5,353
Accretion of discount on short-term investments, net	—	—	(1,819)
Impairment of long-lived assets	—	—	1,987
Non-cash research and development expense	32,325	—	—
Change in fair value of related party convertible loan	5,556	—	—
Change in fair value of warrants liability	(1,816)	326,900	—
Gain on loan extinguishment	—	(4,183)	—
Other adjustments	169	23	126
Changes in operating assets and liabilities:			
Accounts receivable	(1,004)	(497)	(213)
Prepaid expenses and other current assets	274	(10,209)	2,140
Other assets	(682)	(1,777)	2,618
Accounts payable	4,196	(181)	6,487
Amounts due to related parties	(205)	—	—
Amounts due to joint development partners	1,355	6,039	(1,641)
Accrued expenses and other current liabilities	13,112	25,486	6,016
Operating lease liabilities	—	—	(4,875)
Other liabilities	296	(7)	(221)
Net cash used in operating activities	<u>(103,848)</u>	<u>(259,033)</u>	<u>(329,865)</u>
Cash flows from investing activities:			
Repayments from advances to related parties	8	—	—
Purchases of short-term investments	—	—	(398,701)
Proceeds from maturities of short-term investments	—	—	19,908
Purchases of property and equipment	(4,303)	(13,321)	(13,604)
Proceeds from disposal of property and equipment	189	100	520
Purchases of intangible assets	(306)	(416)	(296)
Net cash used in investing activities	<u>(4,412)</u>	<u>(13,637)</u>	<u>(392,173)</u>
Cash flows from financing activities:			
Proceeds from issuance of redeemable convertible preferred stock	291,646	54,693	—
Proceeds from issuance of common stock under the Employee Stock Purchase Plan	—	—	2,286
Proceeds from exercise of warrants for redeemable convertible preferred stock	2,500	183,007	—
Proceeds from issuance of related party convertible loan	50,000	—	—
Proceeds from issuance of warrants	11,943	—	—
Proceeds from exercised stock options	—	1,163	1,872
Proceeds from issuance of common stock upon initial public offering, net of offering costs	—	1,030,965	—
Proceeds from issuance of common stock related to private placement	—	35,000	—
Proceeds from related party loan	5,000	—	—
Proceeds from loans	4,134	—	—
Return of guarantee deposit on related party loan	—	3,715	—

Principal payments on related party loan	(7,900)	(4,398)	—
Payment of third-party costs in connection with initial public offering	—	(3,591)	—
Principal payments on capital and finance lease obligations	(713)	(783)	(1,252)
Principal payments on loans	(115)	(620)	(1,512)
Net cash provided by financing activities	356,495	1,299,151	1,394
Effect of exchange rate changes on cash, cash equivalents and restricted cash	6	260	(983)
Net increase (decrease) in cash, cash equivalents and restricted cash	248,241	1,026,741	(721,627)
Cash, cash equivalents and restricted cash at beginning of period	64,110	312,351	1,339,092
Cash, cash equivalents and restricted cash at end of period	\$ 312,351	\$ 1,339,092	\$ 617,465

The accompanying notes are an integral part of these consolidated financial statements.

TUSIMPLE HOLDINGS, INC.
CONSOLIDATED STATEMENTS OF CASH FLOWS
(in thousands)

	Year Ended December 31,		
	2020	2021	2022
Reconciliation of cash, cash equivalents, and restricted cash to the consolidated balance sheets:			
Cash and cash equivalents	\$ 310,815	\$ 1,337,586	\$ 615,386
Restricted cash included in prepaid expenses and other current assets	1,536	1,506	2,079
Total cash, cash equivalents and restricted cash	<u>\$ 312,351</u>	<u>\$ 1,339,092</u>	<u>\$ 617,465</u>
Supplemental disclosure of cash flow information:			
Cash paid for interest	\$ 1,177	\$ 786	\$ 876
Supplemental schedule of non-cash investing and financing activities:			
Acquisitions of property and equipment included in liabilities	\$ 2,765	\$ 10,542	\$ 3,275
Accretion of redeemable convertible preferred stock	\$ 20,959	\$ 4,135	\$ —
Reclassification of Series D-1 redeemable convertible preferred share warrants to liabilities	\$ 394	\$ —	\$ —
Cashless exercise of share options for common stock	\$ 975	\$ —	\$ —
Conversion of related party convertible loan into Series E-1 redeemable convertible preferred stock	\$ 55,556	\$ —	\$ —
Vesting of early exercised stock options	\$ —	\$ 84	\$ 168
Exercise of liability-classified warrants	\$ —	\$ 369,352	\$ —
Conversion of redeemable convertible preferred stock into common stock upon initial public offering	\$ —	\$ 1,282,916	\$ —

The accompanying notes are an integral part of these consolidated financial statements.

TuSimple Holdings, Inc.
Notes to Consolidated Financial Statements

Note 1. Description of Business and Summary of Significant Accounting Policies

Description of Business

TuSimple Holdings Inc. (“TuSimple” or the “Company”) is a global autonomous driving technology company headquartered in San Diego, California, with operations in the United States (“U.S.”) and Asia-Pacific region (“APAC”). Founded in 2015, TuSimple is working to revolutionize the global truck freight market by developing proprietary technologies that enable the scaled development and deployment of autonomous freight transportation.

TuSimple was originally incorporated as Tusimple (Cayman) Limited, a limited liability company in the Cayman Islands, on October 25, 2016. In February 2021, the Company deregistered as a Cayman Islands exempted company and domesticated as a corporation incorporated under the laws of the State of Delaware (the “Domestication”). The business, assets, and liabilities of the Company and its subsidiaries on a consolidated basis, as well as its principal locations and fiscal year, were the same immediately after the Domestication as they were immediately prior to the Domestication. In addition, the directors and executive officers of the Company immediately after the Domestication were the same individuals who were directors and executive officers, respectively, of the Company immediately prior to the Domestication.

Initial Public Offering and Private Placement

On April 19, 2021, the Company closed its initial public offering (“IPO”) and concurrent private placement, in which it issued and sold 27,027,027 shares and 874,999 shares, respectively, of its authorized Class A common stock at \$40.00 per share, resulting in net proceeds of \$1.0 billion after deducting underwriting discounts and commissions of \$50.1 million and offering costs.

Immediately prior to the closing of the IPO, (i) the Company filed an amended and restated certificate of incorporation, which authorized 4,876,000,000 shares of Class A common stock and reclassified all outstanding common stock into Class A common stock, authorized 24,000,000 shares of Class B common stock, which are not publicly traded, and authorized 100,000,000 shares of undesignated preferred stock, (ii) Xiaodi Hou and Mo Chen (the “Founders”) each exchanged 12,000,000 shares of their newly designated Class A common stock for an equivalent number of shares of Class B common stock, and (iii) all shares of the Company’s outstanding redeemable convertible preferred stock automatically converted into 120,534,419 shares of Class A common stock.

The rights of the holders of Class A common stock and Class B common stock are identical, except with respect to voting, conversion, and transfer rights. The holders of Class A common stock are entitled to one vote per share and the holders of Class B common stock are entitled to 10 votes per share. Additionally, each share of Class B common stock will automatically convert, on a one-for-one basis, into shares of Class A common stock on the earliest of (i) the date specified by a vote of the holders of Class B common stock representing 75% of the outstanding shares of Class B common stock, (ii) the date that is between 90 days and 270 days, as determined by the board of directors, after the death or incapacitation of the last Founder to die or become incapacitated, or (iii) the date that is between 61 days and 180 days, as determined by the board of directors, after the date on which the number of outstanding shares of Class B common stock held by the Founders (or their permitted affiliates) is less than 12,000,000 shares.

Upon the closing of the IPO, the Company recognized \$42.6 million of stock-based compensation expense related to stock options, restricted stock units (“RSUs”), and share value awards (“SVAs”), for which the time-based vesting conditions had been satisfied or partially satisfied and the performance-based conditions were satisfied upon the closing of the IPO.

Additionally, the Company recorded \$4.3 million within operating expenses to former employees in connection with post-employment agreements for which payment was contingent upon the occurrence of an IPO or Sale Event (as such terms are defined in the post-employment agreements).

Basis of Presentation and Consolidation

The accompanying consolidated financial statements (“Financial Statements”) have been prepared in accordance with accounting principles generally accepted in the U.S. (“GAAP”) and applicable rules and regulations of the Securities and Exchange Commission (“SEC”) regarding financial reporting. The Financial Statements include the accounts of the Company and its consolidated subsidiaries. All significant intercompany balances and transactions have been eliminated in consolidation.

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the consolidated financial statements and the reported amounts of revenues and expenses during the reporting period. Significant items subject to such estimates and assumptions include, but are not limited to, the useful lives of long-lived assets, the valuation of stock-based compensation, the fair value of preferred share warrants and related party convertible loans, the measurement of deferred tax assets, the recoverability of long-lived assets, the incremental borrowing rate ("IBR") used in the measurement of right-of-use lease assets and lease liabilities, fair values of investments and other financial instruments (including measurement of credit or impairment losses), and the fair value of equipment under finance leases. On an ongoing basis, management evaluates these estimates and assumptions; however, actual results could materially differ from these estimates.

Cash, Cash Equivalents, and Restricted Cash

Cash and cash equivalents consist of cash in banks and highly liquid investments, primarily money market funds, commercial paper, and U.S. government and agency securities, purchased with an original maturity of three months or less.

Restricted cash is pledged as security for letters of credit or other collateral amounts established by the Company for certain lease obligations, customer deposits, corporate credit cards, and other contractual arrangements. Restricted cash is recorded as prepaid expenses and other current assets in the consolidated balance sheets based on the term of the remaining restriction.

Fair Value Measurements

Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The Company measures financial assets and liabilities at fair value at each reporting period using a fair value hierarchy, which requires the Company to maximize the use of observable inputs and minimize the use of unobservable inputs when measuring fair value. A financial instrument's classification within the fair value hierarchy is based upon the lowest level of input that is significant to the fair value measurement. The levels of inputs used to measure fair value are:

- Level 1 — Observable inputs such as quoted prices in active markets for identical assets or liabilities.
- Level 2 — Observable inputs other than Level 1 prices such as quoted prices for similar assets or liabilities in active markets, quoted prices in markets that are not active or inputs other than the quoted prices that are observable either directly or indirectly for the full term of the assets or liabilities.
- Level 3 — Unobservable inputs in which there is little or no market data that are significant to the fair value of the assets or liabilities.

The Company's primary financial instruments include cash equivalents, short-term investments, accounts receivable, accounts payable, amounts due to joint development partners, accrued expenses, and short-term and long-term debt. The estimated fair value of cash equivalents, accounts receivable, accounts payable, amounts due to joint development partners, accrued expenses, and short-term debt approximates their carrying value due to their short-term nature. Refer to Note 3. Investments and Fair Value Measurements for further information.

Accounts Receivable, Net

Accounts receivable are recorded at invoiced amounts, net of an allowance for credit losses, and do not bear interest. In accordance with Accounting Standards Update No. 2016-13 "*Financial Instruments—Credit Losses*" ("ASC 326"), the Company measures its allowance for credit losses using an expected credit loss model that reflects the Company's current estimate of expected credit losses inherent in the enterprise and the accounts receivable balance. In determining the expected credit losses, the Company considers its historical loss experience, the aging of its accounts receivable balance, current economic and business conditions, and anticipated future economic events that may impact collectability. The Company reviews its allowance for credit losses periodically and, as needed, amounts are written-off when determined to be uncollectible. As of December 31, 2021 and 2022 the allowance for credit losses was immaterial.

Investments

Debt Securities

Accounting for the Company's debt securities is based on the legal form of the security, the Company's intended holding period for the security, and the nature of the transaction. Investments in debt securities are classified as available-for-sale and are initially recorded at fair value. Investments in debt securities include commercial paper, U.S. treasury securities, U.S. government agency securities, and corporate debt securities. Subsequent changes in fair value of available-for-sale debt securities are recorded in other comprehensive income (loss), net of tax. Interest on these debt securities and amortization of premiums and accretion of discounts are included in interest income on the consolidated statements of operations. The Company considers its debt securities as available for use in current operations, including those with maturity dates beyond one year, and, therefore, classifies these securities as short-term investments on the consolidated balance sheets.

The Company accounts for credit losses on available-for-sale debt securities in accordance with ASC 326. At each reporting period, the Company evaluates its available-for-sale debt securities at the individual security level to determine whether there is a decline in the fair value below its amortized cost basis (an impairment). In circumstances where the Company intends to sell, or is more likely than not required to sell, the security before it recovers its amortized cost basis, the difference between fair value and amortized cost is recognized as a loss in the consolidated statements of operations, with a corresponding write-down of the security's amortized cost. In circumstances where neither condition exists, the Company then evaluates whether a decline is due to credit-related factors. The factors considered in determining whether a credit loss exists can include the extent to which fair value is less than the amortized cost basis, changes in the credit quality of the underlying loan obligors, credit ratings actions, as well as other factors. If the Company's assessment indicates that a credit loss exists, the credit loss is measured based on the Company's best estimate of the expected cash flows of the security discounted at the security's effective interest rate compared to the amortized cost basis of the security. A credit-related impairment is limited to the difference between fair value and amortized cost, and recognized as an allowance for credit losses on the consolidated balance sheet with a corresponding adjustment to net income (loss). Any remaining decline in fair value that is non-credit related is recognized in other comprehensive income (loss), net of tax. Improvements in expected cash flows due to improvements in credit are recognized through a reversal of the credit loss and corresponding reduction in the allowance for credit losses. Write-offs of available-for-sale debt securities, which may be full or partial write-offs, are deducted from the allowance for credit losses and recorded in the period in which the securities are deemed uncollectible.

The Company does not measure an allowance for credit losses on accrued interest receivable balances on available-for-sale debt securities as these balances are written-off in a timely manner. Write-offs of accrued interest receivable balances are recorded as a reduction to interest income. There were no write-offs of accrued interest during the year ended December 31, 2022. Accrued interest excluded from the amortized cost of debt securities totaled \$1.8 million as of December 31, 2022, and is reported within prepaid expenses and other current assets on the consolidated balance sheet.

Property and Equipment, Net

Property and equipment, net, are stated at cost less accumulated depreciation or amortization and any recorded impairment. Property and equipment under capital leases are initially recorded at the present value of minimum lease payments. Depreciation and amortization are computed using the straight-line method over the estimated useful lives of the assets, as follows:

Property and Equipment	Estimated Useful Life
Electronic equipment	1-4 years
Vehicles	5-6 years
Office and other equipment	5-7 years
Leasehold improvements	Shorter of lease term or estimated useful life of the asset
Buildings	Shorter of lease term or estimated useful life of the asset

When assets are retired or otherwise disposed of, the cost, accumulated depreciation and amortization are removed from the accounts and any resulting gain or loss is reflected in the consolidated statements of operations in the period realized. Maintenance and repairs that do not enhance or extend the asset's useful life are charged to operating expense as incurred.

Assets acquired under a finance lease are amortized in a manner consistent with the Company's depreciation policy for owned assets if the lease transfers ownership to the Company at the end of the lease term or contains a bargain purchase option. Otherwise, assets acquired under a finance lease are amortized over the lease term.

Intangible Assets, Net

Intangible assets represent patents, which are carried at cost and amortized on a straight-line basis over their estimated useful lives of 20 years and presented within other assets in the Company's consolidated balance sheets. The Company reviews intangible assets for impairment under the long-lived asset model described in the Impairment of Long-Lived Assets section. There have been no impairment charges recorded in any of the periods presented in the accompanying consolidated financial statements. As of December 31, 2021 and 2022, intangible assets are immaterial.

Impairment of Long-Lived Assets

The Company evaluates long-lived assets for impairment whenever events or changes in circumstances indicate that the carrying amount of an asset may not be recoverable. Recoverability of assets held and used is measured by comparison of the carrying amount of an asset or asset group to estimated undiscounted future cash flows expected to be generated by the asset or asset group. If the carrying amount of an asset or asset group exceeds estimated undiscounted future cash flows, then an impairment charge is recognized based on the excess of the carrying amount of the asset or asset group over its fair value. For the year ended December 31, 2022, the Company recorded an impairment charge of \$2.0 million to long-lived assets in connection with restructuring activities during the year.

Leases

The Company accounts for leases in accordance with Accounting Standards Codification ("ASC") 842, *Leases* ("ASC 842"), which requires lessees to recognize the rights and obligations created by leases on the balance sheet and disclose key information about leasing arrangements. The Company adopted ASC 842 along with all applicable ASU clarifications and improvements on January 1, 2022, using the modified retrospective transition method and used the effective date as the date of initial application. Consequently, financial information is not updated and disclosures required under ASC 842 are not provided for periods before January 1, 2022. ASC 842 provides a number of optional practical expedients that companies can elect to apply during the standard's transition. The Company elected the "package of practical expedients," which permits the Company not to reassess under ASC 842 its prior conclusions about lease identification, lease classification, and initial direct costs.

The Company determines if a contract contains a lease based on whether it has the right to obtain substantially all of the economic benefits from the use of an identified asset and whether it has the right to direct the use of an identified asset in exchange for consideration, which relates to an asset which the Company does not own. Right-of-use ("ROU") assets represent the Company's right to use an underlying asset for the lease term and lease liabilities represent the Company's obligation to make lease payments arising from the lease. ROU assets are recognized as the lease liability, adjusted for lease incentives received. Lease liabilities are recognized at the present value of the future lease payments at the lease commencement date, net of lease incentive receivable. The interest rate used to determine the present value of the future lease payments is the Company's incremental borrowing rate ("IBR") unless the interest rate implicit in the lease agreement is readily determinable. Lease payments may be fixed or variable, however, only fixed payments or in-substance fixed payments are included in the Company's lease liability calculation. Variable lease payments are recognized in operating expenses in the period in which the obligation for those payments are incurred.

The Company has lease agreements with lease and non-lease components and has elected to utilize the practical expedient to account for lease and non-lease components together as a single combined lease component. Additionally, for certain leases previously identified as build-to-suit leasing arrangements under legacy accounting, the Company has derecognized those leases pursuant to the transition guidance provided for build-to-suit leases in ASC 842. Such leases have been reassessed as operating leases as of the adoption date under ASC 842, and are included on the consolidated balance sheet as of December 31, 2022.

The Company has leases that include one or more options to extend the lease term for up to five years and some of its leases include options to terminate the lease prior to the end of the agreed upon lease term. For purposes of calculating lease liabilities, lease terms include options to extend or terminate the lease when it is reasonably certain that the Company will exercise such options.

Operating leases are included within operating lease ROU assets, operating lease liabilities, current, and operating lease liabilities, noncurrent on the Company's consolidated balance sheet as of December 31, 2022. Finance leases are included in property and equipment, net, accrued expenses and other current liabilities, and other liabilities on the Company's consolidated balance sheet as of December 31, 2022.

The Company has elected not to present short-term leases on the consolidated balance sheet as these leases have a lease term of 12 months or less at lease inception and do not contain purchase options or renewal terms that the Company is reasonably certain to exercise.

Adoption of the new lease standard on January 1, 2022 impacted the consolidated financial statements as follows: (i) recognition of ROU assets of \$32.9 million and lease liabilities of \$35.1 million for operating leases, (ii) derecognition of build-to-suit lease assets and liabilities of \$6.5 million and \$4.4 million, respectively, with the net impact of \$0.2 million recorded to accumulated deficit as of January 1, 2022, and (iii) reclassification of deferred rent and other liability balances of \$2.5 million relating to its existing lease arrangements into the ROU asset balance as of January 1, 2022. The standard did not materially impact the consolidated statement of operations or consolidated statement of cash flows.

Revenue Recognition

The Company earns revenue from the delivery of freight capacity services. Revenue from freight capacity services is recognized when the customer obtains control of promised services in an amount that reflects the consideration the Company expects to receive in exchange for those services. To date, the Company has not generated revenue from carrier-owned services.

Satisfaction of Performance Obligation

A performance obligation is a promise in a contract to transfer a distinct good or service to the customer and is the basis of revenue recognition in accordance with GAAP. To determine the proper revenue recognition method for its contracts with customers, the Company evaluates whether two or more contracts should be combined and accounted for as one single contract and whether the combined or single contract should be accounted for as more than one performance obligation. In the Company's case, its contracts with customers are for the delivery of distinct services within a single contract, such as freight capacity services, and include only one performance obligation.

Revenue from freight capacity services is recognized over time as the Company performs the services in the contract because of the continuous transfer of control to the customer. The Company's customers receive the benefit of the Company's services as the goods are transported from one location to another. If the Company were unable to complete delivery to the final location, another entity would not need to re-perform the freight capacity service already performed. As control transfers over time, revenue is recognized based on the extent of progress towards completion of the performance obligation. The selection of the method to measure progress towards completion requires judgment and is based on the nature of the products or services to be provided. Management estimates the progress based on mileage completed to total mileage to be transported. Revenues are recorded net of value-added taxes and surcharges.

Contract Modification

Customer contracts may be modified to account for changes in the rates the Company charges its customers or to add additional distinct services. The Company considers contract modifications to exist when the modification either creates new enforceable rights and obligations or alters the existing arrangement. Contract modifications that add distinct goods or services are treated as separate performance obligations. Contract modifications that do not add distinct goods or services typically change the price of existing services. These contract modifications are accounted for prospectively as the remaining performance obligations are executed.

Payment Terms

Under typical payment terms of the Company's customer contracts, the customer pays at periodic intervals (i.e., every 14 days, 30 days, etc.) for shipments included on invoices received. It is not customary business practice to extend payment terms past 90 days, and as such, the Company does not have a practice of including a significant financing component within its contracts with customers.

Contract Costs

Incremental costs of obtaining contracts are expensed as incurred if the amortization period of the assets is one year or less. These costs are included within cost of revenue in the consolidated statements of operations.

Disaggregation of Revenue and Remaining Performance Obligations

The Company earns all of its revenue within the U.S. and there is no revenue related to any other geographies. Additionally, due to the short-term nature of the Company's customer contracts, there are no remaining unsatisfied performance obligations as of December 31, 2022.

Cost of Revenue

Cost of revenue consists primarily of fuel costs, insurance costs, depreciation of property and equipment (including semi-trucks acquired under capital leases), labor costs, and other costs directly attributable to providing freight capacity services.

Software Development Costs

The Company evaluates capitalization of certain software development costs incurred in development of software to be sold, leased, or otherwise marketed, subsequent to the establishment of technological feasibility. Based on the Company's product development process and substantial development risks, technological feasibility for the Company's L4 autonomous driving technology has not been established. Accordingly, the Company charges all such costs to research and development expense in the period incurred.

Software development costs for internal use software are subject to capitalization during the application development stage, beginning when a project that will result in additional functionality is approved and ending when the software is put into productive use. Due to the Company's iterative development process and short development cycles, the costs incurred between these stages are not material and are charged to research and development expense as incurred.

Research and Development ("R&D")

R&D expenses consist primarily of personnel-related expenses, including stock-based compensation costs, associated with software developers and engineering personnel and consultants responsible for the design, development, and testing of the Company's L4 autonomous driving technology, and allocated overhead costs. Research and development costs are expensed as incurred.

Selling, General and Administrative ("SG&A")

SG&A expenses consist primarily of personnel-related expenses, including stock-based compensation costs, associated with the Company's sales, marketing, management, and administration activities, professional service fees, and other general corporate expenses. Selling, general and administrative costs are expensed as incurred.

Stock-Based Compensation

The Company accounts for stock-based compensation expense in accordance with the fair value recognition and measurement provisions of GAAP, which requires compensation cost for the grant-date fair value of stock-based awards to be recognized over the requisite service period. The Company determines the fair value of stock-based awards granted or modified on the grant date (or modification date, if applicable) at fair value, using appropriate valuation techniques.

Time-Based Service Awards

For stock-based awards with time-based vesting conditions only, generally being RSUs and stock options, stock-based compensation is recognized straight-line over the requisite service period, which is generally four years. The fair value of RSUs is measured on the grant date based on the fair value of the underlying common stock. The fair value of stock option awards is estimated on the grant date using the Black-Scholes option-pricing model which incorporates various assumptions, including the fair value of the underlying common stock, the expected stock price volatility over the term of the award, the risk-free interest rate for the expected term of the award and the expected dividends. The Company accounts for forfeitures as they occur.

Performance-Based Awards

The Company has granted RSUs, SVAs, and stock options that vest only upon the satisfaction of both time-based service and performance-based conditions. The time-based service condition for these awards generally is satisfied over four years. The performance-based conditions, other than with respect to the 2021 CEO Performance Award discussed in Note 10. Stock-Based Compensation, are satisfied upon the occurrence of a qualifying event, defined as the earlier of (i) the closing of certain specific liquidation or change in control transactions, or (ii) an IPO. The Company records stock-based compensation expense for performance-based equity awards such as RSUs, SVAs, and stock options using the accelerated attribution method over the requisite service period, which is generally four years, and only if performance-based conditions are considered probable to be satisfied. Upon completion of the IPO in April 2021, the Company recorded a cumulative one-time stock-based compensation expense determined using the grant-date fair values. Stock-based compensation related to remaining time-based service after the qualifying event is recorded over the remaining requisite service period.

For performance-based RSUs and SVAs, the Company determines the grant-date fair value as the fair value of the Company's common stock on the grant date. For performance-based stock options, the Company determines the grant-date fair value using the Black-Scholes option-pricing model described above.

For the 2021 CEO Performance Award with a vesting schedule based on the attainment of both performance and market-based conditions, stock-based compensation expense associated with each tranche is recognized over the longer of (i) the expected achievement period for the operational milestones for such tranche and (ii) the expected achievement period for the related market capitalization milestone determined on the grant date, beginning at the point in time when the relevant operational milestones are considered probable of being met. If such operational milestones become probable any time after the grant date, the Company will recognize a cumulative catch-up expense from the grant date to that point in time. If the related market capitalization milestone is achieved earlier than its expected achievement period, then the stock-based compensation expense will be recognized over the expected achievement period for the operational milestones, which may accelerate the rate at which such expense is recognized. The fair value of such awards is estimated on the grant date using Monte Carlo simulations. Refer to Note 10. Stock-Based Compensation for further information.

Market-Based Awards

For the 2022 CEO Award with a vesting schedule based on the satisfaction of both time-based service and market-based conditions, the Company determines the grant-date fair value utilizing Monte Carlo simulations and recognizes stock-based compensation expense associated with each tranche over the longer of (i) the expected achievement period for the market milestones and (ii) the explicit time-based service period. Refer to Note 10. Stock-Based Compensation for further information.

Employee Stock Purchase Plan ("ESPP")

The Company recognizes stock-based expense related to shares issued pursuant to the ESPP on a straight-line basis over the offering period. The ESPP provides for six-month offering periods. The ESPP allows eligible employees to purchase shares of Class A common stock at a 15% discount on the lower of our stock price on either (i) the offering period beginning date or (ii) the purchase date. No employee may purchase shares under the ESPP at a rate in excess of \$25,000 worth of Class A common stock based on the fair market value per share of Class A common stock at the beginning of an offering for each calendar year such purchase right is outstanding or 1,500 shares. The Company estimates the fair value of shares to be issued under the ESPP based on a combination of options valued using the Black-Scholes option-pricing model. Volatility is determined over an expected term of six months based on the Company's historical volatility. The expected term is estimated based on the contractual term.

Restructuring and Related Charges

Costs associated with management-approved restructuring activities consist primarily of employee severance and termination benefits, impairment of long-lived assets (including ROU assets) and write-off of long-lived assets used in the Company's research and development activities. The Company recognizes restructuring and related charges when they are incurred. One-time employee termination costs are recognized at the time of communication to employees, unless future service is required, in which case the costs are recognized ratably over the future service period. Ongoing employee termination benefits are recognized as a liability when it is probable that a liability exists and the amount is reasonably estimable. Costs associated with the impairment of long-lived assets and ROU assets are accounted for under the long-lived assets accounting guidance or lease accounting guidance. Additionally, the Company wrote-off all existing long-lived assets used in the Company's research and development as of December 31, 2022, as they no longer meet the criteria for capitalization subsequent to the restructuring.

Restructuring and related charges are recognized as an operating expense within the consolidated statements of operations and related liabilities are recorded within accrued expenses and other liabilities on the consolidated balance sheets.

Income Taxes

Current income taxes are provided for in accordance with the relevant statutory tax laws and regulations.

Income taxes are accounted for under the asset and liability method of accounting. Under this method, deferred tax assets and liabilities are determined based on the differences between the financial reporting and the tax bases assets and liabilities and are measured using the enacted tax rates and laws that will be in effect when the differences are expected to reverse. A valuation allowance is provided when it is more likely than not that a deferred tax asset will not be fully realized. Due to our lack of earnings history, the net deferred tax assets have been fully offset by a valuation allowance.

The Company operates in various tax jurisdictions and is subject to audit by tax authorities. The Company recognizes the tax benefit of an uncertain tax position only if it is more likely than not that the position is sustainable upon examination by the taxing authority, based on the technical merits. The tax benefit recognized is measured as the largest amount of benefit which is more likely than not to be realized upon settlement with the taxing authority. The Company recognizes interest accrued and penalties related to unrecognized tax benefits in the provision for income taxes.

Foreign Currency

The functional currency of the Company's foreign subsidiaries is the local currency or U.S. dollar depending on the nature of the subsidiaries' activities. Foreign currency transactions recognized in the consolidated statements of operations are converted to the functional currency by applying the exchange rate prevailing on the date of the transaction. Monetary assets and liabilities denominated in currencies other than the functional currency are remeasured monthly using the month-end exchange rate. Gains and losses resulting from foreign currency transactions and the effects of remeasuring monetary assets and liabilities are recorded in other income in the consolidated statements of operations. Subsidiary assets and liabilities with non-U.S. dollar functional currencies are translated at the month-end rate, retained earnings and other equity items are translated at historical rates, and revenues and expenses are translated at average exchange rates during the year. Cumulative translation adjustments are recorded within accumulated other comprehensive loss, a separate component of stockholders' equity (deficit).

Comprehensive Loss

Comprehensive loss consists of two components: net loss and other comprehensive loss. Other comprehensive loss refers to losses that are recorded as an element of stockholders' equity (deficit) and are excluded from net loss. The Company's other comprehensive loss is composed of foreign currency translation adjustments.

Net Loss Per Share Attributable to Common Stockholders

The Company computes net loss per share using the two-class method required for participating securities. The two-class method requires income available to common stockholders for the period to be allocated between common stock and participating securities based upon their respective rights to receive dividends as if all income for the period had been distributed.

Prior to conversion to common stock upon the Company's IPO, the holders of the redeemable convertible preferred stock would have been entitled to dividends in preference to common stockholders, at a rate no less than the rate at which dividends are paid to common stockholders, prior to any payment of dividends to common stockholders. These participating securities do not contractually require the holders of such shares to participate in the Company's losses. As such, net losses for the periods presented were not allocated to the redeemable convertible preferred stock.

The Company's basic net loss per share attributable to common stockholders is calculated by dividing net loss attributable to common stockholders by the weighted-average number of shares of common stock outstanding for the period, without consideration of potentially dilutive securities. The diluted net loss per share is calculated by giving effect to all potentially dilutive securities outstanding for the period using the treasury stock method or the if-converted method based on the nature of such securities. Diluted net loss per share is the same as basic net loss per share in periods when the effects of potentially dilutive common stock are anti-dilutive.

Segment Information

The Company determines its reportable segments based on how the chief operating decision maker ("CODM") manages the business, allocates resources, makes operating decisions, and evaluates operating performance.

In connection with the changes in the Company's management and the restructuring activities that occurred during the fourth quarter of fiscal year 2022, effective December 31, 2022, the Company determined that its CODM is the Chief Executive Officer, and identified two reportable segments: U.S. and APAC. These segments represent the components of the Company for which separate financial information is available that is utilized on a regular basis by the CODM in assessing segment performance and in allocating the Company's resources.

Prior to the change in segments, the Company operated with one reportable segment, as the CODM, which was a management committee comprised of senior executives, allocated resources and assessed performance based upon consolidated financial information. Prior year comparable period segment disclosures have been restated to conform to the current year presentation. See Note 13. Segment and Geographic Information for additional details.

Commitments and Contingencies

In the normal course of business, the Company is subject to loss contingencies, such as legal proceedings arising out of its business, that cover a wide range of matters. An accrual for a loss contingency is recognized when it is probable that a liability has been incurred and the amount of loss can be reasonably estimated. If a potential material loss contingency is not probable but is reasonably possible, or is probable but cannot be estimated, then the nature of the contingent liability, together with an estimate of the range of possible loss if determinable and material, is disclosed. See Note 8. Commitments and Contingencies for additional details.

Reclassifications

Certain prior period balances have been reclassified to conform to the current period presentation in the consolidated financial statements and the accompanying notes. Sales and marketing expense and general and administrative expense have been reclassified to selling, general and administrative expense. Interest income has been reclassified from other income (expense), net to interest income.

Recently Adopted Accounting Pronouncements

In February 2016, the Financial Accounting Standards Board ("FASB") issued Accounting Standards Update ("ASU") No. 2016-02, *Leases*, to require lessees to recognize all leases, with limited exceptions, on the balance sheet, while recognition on the statement of operations will remain similar to legacy lease accounting, ASC 840. Subsequently, the FASB issued ASU No. 2018-10, *Codification Improvements to Topic 842*, ASU No. 2018-11, *Targeted Improvements*, ASU No. 2018-20, *Narrow-Scope Improvements for Lessors*, and ASU 2019-01, *Codification Improvements*, to clarify and amend the guidance in ASU No. 2016-02. As disclosed above, the Company adopted the ASUs on January 1, 2022 on a modified retrospective basis.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments-Credit Losses (Topic 326), Measurement of Credit Losses on Financial Instruments*, as amended by subsequently issued ASUs 2018-19, 2019-04, 2019-05, 2019-10, 2019-11, 2020-02, 2020-03 and 2022-02 (collectively, "Topic 326"). Topic 326 requires entities to utilize a new impairment model known as the current expected credit loss ("CECL") model for certain financial assets held at each reporting date. The CECL model requires entities to estimate lifetime "expected credit loss" amounts and record them as an allowance that, when deducted from the amortized cost basis of the financial asset, presents the net amount expected to be collected on the financial asset. The CECL model is expected to result in more timely recognition of credit losses. The guidance also amends the impairment model for available for sale debt securities and requires entities to determine whether all or a portion of the unrealized loss on such debt security is a credit loss. The Company adopted the updates for the year ended December 31, 2022 with no material impact on its consolidated financial statements.

In August 2020, the FASB issued ASU No. 2020-06, *Debt – Debt with Conversion and Other Options (Subtopic 470-20) and Derivatives and Hedging Contracts – Contracts in Entity’s Own Equity (Subtopic 815-40): Accounting for Convertible Instruments and Contracts in an Entity’s Own Equity*, which amends the guidance on convertible instruments and the derivatives scope exception for contracts in an entity’s own equity, and also improves and amends the related EPS guidance for both Subtopics. The amendments in the new standard are to address issues identified as a result of the complexity associated with applying GAAP for certain financial instruments with characteristics of liabilities and equity. The Company adopted the updates for the year ended December 31, 2022 with no material impact on its consolidated financial statements.

In October 2020, the FASB issue ASU No. 2020-10, *Codification Improvements*, which updates various codification topics by clarifying or improving disclosure requirements to align with the SEC’s regulations. The Company adopted the updates as of January 1, 2022 with no material impact on its consolidated financial statements.

Recently Issued Accounting Pronouncements

The Company does not believe that any other recently issued, but not yet effective, accounting pronouncements will have a material effect on its consolidated financial statements.

Note 2. Concentrations and Risks

Concentration of Credit Risk

Cash and cash equivalents and short-term investments are potentially subject to concentrations of credit risk. The Company's investment policy limits the amount of credit exposure with any one financial institution or commercial issuer and sets requirements regarding credit rating and investment maturities to safeguard liquidity and minimize risk. The majority of the Company's cash deposits exceed insured limits and are placed with financial institutions around the world that the Company believes are of high credit quality. The Company has not experienced any material losses related to these concentrations during the years ended December 31, 2020, 2021, and 2022.

Currency Convertibility Risk

The revenues and expenses of the Company's subsidiaries in China are generally denominated in Renminbi ("RMB") and their assets and liabilities are primarily denominated in RMB, which is not freely convertible into foreign currencies. The Company's cash denominated in RMB that is subject to such government controls amounted to RMB 49.2 million (equivalent to \$7.7 million) and RMB 168.4 million (equivalent to \$24.2 million) as of December 31, 2021 and 2022, respectively. The value of the RMB is subject to changes in the central government policies and international economic and political developments affecting the supply and demand of RMB in the PRC foreign exchange trading system market. In the PRC, certain foreign exchange transactions are required by law to be transacted only by authorized financial institutions at exchange rates set by the People's Bank of China (the "PBOC"). Remittances from China in currencies other than RMB by the Company must be processed through the PBOC or other China foreign exchange regulatory bodies which require certain supporting documentation in order to process the remittance.

Note 3. Investments and Fair Value Measurements

Investments

Investments on the condensed consolidated balance sheets consisted of the following (in thousands):

	As of December 31, 2022						
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Allowance for Credit Losses	Fair Value	Cash and Cash Equivalents	Short-term Investments
Available-for-sale debt securities:							
U.S. treasury securities	\$ 9,843	\$ —	\$ (86)	\$ —	\$ 9,757	\$ —	\$ 9,757
U.S. government agency securities	97,139	34	(521)	—	96,652	—	96,652
Commercial paper	138,973	10	(207)	—	138,776	25,390	113,386
Corporate debt securities	159,045	55	(1,583)	—	157,517	—	157,517
Total	<u>\$ 405,000</u>	<u>\$ 99</u>	<u>\$ (2,397)</u>	<u>\$ —</u>	<u>\$ 402,702</u>	<u>\$ 25,390</u>	<u>\$ 377,312</u>

The Company did not hold any investments in debt securities as of December 31, 2021.

The fair value and amortized cost of the Company's debt securities with a stated contractual maturity or redemption date were as follows (in thousands):

	As of December 31, 2022	
	Cost	Fair Value
Due in one year or less	\$ 211,919	\$ 211,266
Due in one year through five years	193,081	191,436
Total	<u>\$ 405,000</u>	<u>\$ 402,702</u>

The Company purchases investment grade marketable debt securities rated by nationally recognized statistical credit rating organizations in accordance with its investment policy, which is designed to minimize the Company's exposure to credit losses. The Company regularly reviews its investment portfolios to determine if any investment is impaired due to changes in credit risk or other potential valuation concerns.

As of December 31, 2022, investments in an unrealized loss position for which an allowance for credit losses have not been recognized had an aggregate fair value of \$342.4 million. None of these investments were in a continuous unrealized loss position for more than twelve months. The Company does not intend to sell these investments until the recovery of their amortized cost basis or maturity and further believes that it is not more-likely-than-not that it will be required to sell these investments. The unrealized losses were primarily related to changes in interest rates, market spreads, and market conditions subsequent to purchase. The Company believes none of these debt securities were impaired due to credit risk or other valuation concerns, and, therefore, did not record a credit loss or an allowance for credit losses.

Interest income from cash and cash equivalents and short-term investments was \$0.5 million, \$1.6 million, and \$16.9 million for the years ended December 31, 2020, 2021, and 2022, respectively.

Fair Value Measurements

The following table presents the Company's assets and liabilities that are measured at fair value on a recurring basis and indicates the fair value hierarchy of the valuation (in thousands):

	As of December 31, 2022			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	\$ 530,674	\$ 530,674	\$ —	\$ —
Commercial paper	25,390	—	25,390	—
Total cash equivalents	\$ 556,064	\$ 530,674	\$ 25,390	\$ —
Short-term investments:				
U.S. treasury securities	\$ 9,757	\$ 9,757	\$ —	\$ —
U.S. government agency securities	96,652	—	96,652	—
Commercial paper	113,386	—	113,386	—
Corporate debt securities	157,517	—	157,517	—
Total short-term investments	\$ 377,312	\$ 9,757	\$ 367,555	\$ —
Total	\$ 933,376	\$ 540,431	\$ 392,945	\$ —

	As of December 31, 2021			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	\$ 1,077,550	\$ 1,077,550	\$ —	\$ —
Total	\$ 1,077,550	\$ 1,077,550	\$ —	\$ —

Warrants Liability

In February and March 2021, TRATON Group ("TRATON") and its subsidiary Navistar, Inc. ("Navistar") exercised warrants to purchase 4,331,644 and 9,477,073 shares of Series E-2 and Series E redeemable convertible preferred stock at an exercise price of \$11.31 and \$14.14, resulting in proceeds of \$49.0 million and \$134.0 million, respectively. Immediately prior to their exercise, the fair value of the warrants liability was remeasured using the Black-Scholes model, resulting in a loss upon remeasurement of \$326.9 million. The warrants exercised by TRATON represented only a portion of the warrants they owned and the unexercised warrants expired as of the exercise date. As of December 31, 2021 and 2022, there were no warrants outstanding. Refer to Note 9. Redeemable Convertible Preferred Stock and Preferred Stock Warrants, and Stockholders' Equity (Deficit) for further information.

The Company used the following assumptions in the model:

	As of	
	February 26, 2021	March 19, 2021
Discount for lack of marketability	—	—
Fair value of underlying securities	\$40.00	\$40.00
Expected volatility	62.95%	60.85%
Expected term (in years)	1.76	0.79
Risk-free interest rate	0.14%	0.08%

The following table sets forth a summary of the changes in the estimated fair value of the Company's warrants liability (in thousands):

	Warrant Liabilities
Balance as of December 31, 2019	\$ —
Issuance of warrants	44,268
Reclassification of warrants from equity to liability	394
Exercises during the period	(394)
Change in fair value of warrants	(1,816)
Balance as of December 31, 2020	\$ 42,452
Change in fair value of warrants	326,900
Exercises during the period	(369,352)
Balance as of December 31, 2021	\$ —

Note 4. Property and Equipment, Net

Property and equipment as of December 31, 2021 and 2022 were as follows (in thousands):

	As of December 31,	
	2021	2022
Electronic equipment	\$ 12,761	\$ 4,385
Office and other equipment	9,423	8,697
Vehicles	21,043	4,046
Leasehold improvements	11,984	12,267
Buildings	—	1,841
Construction in progress	5,258	358
Property and equipment, gross	60,469	31,594
Accumulated depreciation and amortization	(24,416)	(14,511)
Property and equipment, net	\$ 36,053	\$ 17,083

Depreciation and amortization expense was \$7.7 million and \$9.5 million for the years ended December 31, 2020 and 2021, respectively. Depreciation and amortization expense for the year ended December 31, 2022 was \$27.6 million, which included write-offs of \$16.3 million as a result of restructuring activities during the fourth quarter of 2022. Refer to Note 15. Restructuring and Related Charges for further information.

As of December 31, 2021, property and equipment financed under capital leases was \$3.3 million, net of accumulated amortization of \$2.5 million. As of December 31, 2022, property and equipment under finance leases was \$1.6 million, net of accumulated depreciation of \$0.9 million.

Note 5. Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities as of December 31, 2021 and 2022 were as follows (in thousands):

	As of December 31,	
	2021	2022
Accrued payroll	\$ 33,225	\$ 35,563
Accrued professional fees	1,938	4,798
Other	6,535	7,899
Accrued expenses and other current liabilities	\$ 41,698	\$ 48,260

Note 6. Debt

Scania Loan

In April 2020, in connection with a development agreement entered into with Scania CV AB (“Scania”), an affiliate of TRATON, the Company received a \$5.0 million loan from Scania to cover the Company’s costs related to the program. The loan does not accrue interest and is repayable upon the acquisition by Scania or a Scania Affiliate of shares or other financial instruments in the Company. In September 2020, TRATON acquired 1,232,370 of the Company’s Series D-1 redeemable convertible preferred shares and the loan was repaid in full in October 2020.

Payroll Protection Program (“PPP”) Loan

In April 2020, the Company received loan proceeds in the amount of \$4.1 million under the Small Business Administration (“SBA”) Paycheck Protection Program established under Section 1102 of the Coronavirus Aid, Relief and Economic Security (“CARES”) Act. The loan accrued interest at a rate of 1.0% per annum and originally matured in 24 months. All of the proceeds of the PPP Loan were used by the Company to pay eligible payroll costs and the Company maintained its headcount and otherwise complied with the terms of the PPP Loan.

In October 2020, the Company applied for forgiveness of the PPP Loan and corresponding accrued interest, which was approved by the SBA in June 2021, resulting in a gain on loan extinguishment of \$4.2 million. Under the PPP, the SBA reserves the right to audit any PPP loan forgiveness application for a period of six years from the date of loan forgiveness.

Related Party Convertible Loan

In June 2020, the Company entered into a convertible loan agreement with SUN Dream, Inc., a preferred shareholder in the Company, to issue convertible debt in the amount of \$50.0 million (“Convertible Loan”). The Convertible Loan accrued interest at a rate of 10.0% per annum and originally matured in June 2021. On or before the maturity date, the Convertible Loan, at the option of SUN Dream, Inc., could be converted in whole or in part into the Company’s shares issued in the next round of financing (“Next Financing”) equal to the quotient of the outstanding principal amount of the Convertible Loan divided by a price per share equal to 90% of the applicable purchase price in such financing (“Discounted Conversion Price”); provided that the New Financing was consummated within six months following the issuance of the Convertible Loan and the Discounted Conversion Price was not lower than the original issue price of Series D-1 redeemable convertible preferred shares, which was \$8.11.

In December 2020, in connection with the Company’s Series E financing, the Convertible Loan converted into 3,928,937 Series E-1 redeemable convertible preferred shares at a conversion price of \$12.73.

Truck Purchase Loans

During 2020 and 2021, the Company entered into multiple loan agreements with aggregate principal amounts of \$1.9 million and \$5.6 million, respectively, to finance its purchase of trucks. The 2020 loans accrue interest at a rate of 8.95% per annum and have original maturities of 42 months. The 2021 loans accrue interest at rates from 6.96% to 9.73% per annum and have original maturities of 60 months.

As of December 31, 2022, the current portion of the truck loan principal amount is \$1.6 million and the noncurrent portion of the truck loan principal amount is \$3.5 million, which are included in short-term debt and the long-term debt in the consolidated balance sheets, respectively.

Note 7. Leases

The balances for the operating and finance leases where the Company is the lessee are presented within the consolidated balance sheets as follows (in thousands):

	As of December 31, 2022
Operating leases:	
Operating lease right-of-use assets	\$ 44,952
Operating lease liabilities:	
Operating lease liabilities, current	\$ 6,007
Operating lease liabilities, noncurrent	42,169
Total operating lease liabilities	\$ 48,176
Finance leases:	
Property and equipment, at cost	\$ 2,465
Accumulated depreciation	(882)
Property and equipment, net	\$ 1,583
Accrued expenses and other current liabilities:	
Accrued expenses and other current liabilities	\$ 1,116
Other liabilities	2,429
Total finance lease obligations	\$ 3,545

The components of lease expense were as follows (in thousands):

	Year Ended December 31, 2022
Operating lease expense:	
Operating lease expense ⁽¹⁾⁽²⁾	\$ 9,112
Finance lease expense:	
Amortization of leased assets	\$ 1,454
Interest on lease liabilities	592
Total finance lease expense	\$ 2,046
Total lease expense	\$ 11,158

(1) Includes short-term leases and variable lease costs, which are immaterial.

(2) Excludes sublease income, which is immaterial.

Other information related to leases where the Company is the lessee is as follows:

	As of December 31, 2022
Weighted-average remaining lease term:	
Operating leases	8.5 years
Finance leases	2.8 years
Weighted-average discount rate:	
Operating leases	4.4 %
Finance leases	11.2 %

Supplemental cash flow information related to leases where the Company is the lessee is as follows (in thousands):

	Year Ended December 31, 2022	
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	\$	6,768
Operating cash flows from finance leases (interest payments)	\$	420
Financing cash flows from finance leases	\$	1,252
Right-of-use assets obtained in exchange for lease obligations:		
Operating lease liabilities	\$	48,523
Finance lease liabilities	\$	11,056

As of December 31, 2022, the maturities of the Company's operating and financing lease liabilities (excluding short-term leases) are as follows (in thousands):

	Operating Leases	Finance Leases
2023	\$ 7,649	\$ 1,433
2024	7,711	1,430
2025	7,608	1,157
2026	7,818	106
2027	6,884	—
Thereafter	21,605	—
Total minimum lease payments	59,275	4,126
Less: lease incentives receivable ⁽¹⁾	(646)	—
Less: imputed interest	(10,453)	(581)
Present value of minimum lease payments	48,176	3,545
Less: current portion	(6,007)	(1,116)
Lease obligations, noncurrent	<u>\$ 42,169</u>	<u>\$ 2,429</u>

(1) Lease incentives receivable represent amounts relating to the Company's leasehold improvements that will be paid by the landlord pursuant to lease provisions with relevant landlord.

As of December 31, 2022, the Company has additional leases for facilities that have not yet commenced with lease obligations of \$0.2 million. These leases will commence in 2023 with lease terms of four to five years. This table does not include lease payments related to these leases.

Supplemental Information for Comparative Periods

Prior to the adoption of ASC 842, future minimum lease payments for non-cancelable operating and capital leases as of December 31, 2021 were as follows (in thousands):

	Operating Leases	Capital Lease s
2022	\$ 7,660	\$ 1,253
2023	7,891	978
2024	5,126	963
2025	3,435	1,761
2026	3,049	—
Thereafter	22,524	—
Total minimum lease payments	<u>\$ 49,685</u>	4,955
Amount representing interest		(1,317)
Present value of minimum lease payments		<u>\$ 3,638</u>

Rent expense for operating leases, as previously reported under former lease accounting standards, was \$4.6 million and \$5.7 million for the years ended December 31, 2020 and 2021, respectively.

Note 8. Commitments and Contingencies

Joint Development Agreements

In July 2020, the Company entered into a Joint Development Agreement (“JDA”) with Navistar under which the parties would work collaboratively to develop a purpose-built L4 autonomous semi-truck. Pursuant to the JDA, the Company agreed to reimburse Navistar up to \$10.0 million for research and development expenses incurred. Payment of reimbursements is deferred to align with the achievement of certain milestones and reimbursements due are recorded within amounts due to joint development partners in the accompanying consolidated balance sheets. On December 5, 2022, TuSimple and Navistar announced an end to the co-development under the JDA. Navistar incurred the full \$10.0 million of expenses eligible for reimbursement under the JDA as of December 31, 2021. No expenses were incurred under the JDA during the year ended December 31, 2022.

Indemnification Obligations

The Company has entered into indemnification agreements with its officers, directors, and certain current and former employees, and its certificate of incorporation and bylaws contain certain indemnification obligations. It is not possible to make a reasonable estimate of the maximum potential amount under these indemnification agreements due to the unique facts and circumstances involved in each particular agreement. Additionally, the Company has a limited history of prior indemnification claims, and the payments it has made under such agreements have not had a material adverse effect on its results of operations, cash flows, or financial position. However, to the extent that valid indemnification claims arise in the future, future payments by the Company could be significant and could have a material adverse effect on its results of operations or cash flows in a particular period.

Litigation and Legal Proceedings

Except as described below, the Company believes it is not presently a party to any litigation the outcome of which, if determined adversely against the Company, would individually or in the aggregate have a material adverse effect on the Company’s business, financial condition, cash flows, or results of operations.

Shareholder Securities Litigation

On August 31, 2022, a securities class action complaint (the “August 2022 Action”) was filed, in the United States District Court for the Southern District of California, against the Company and certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through August 1, 2022. The August 2022 Action is captioned: *Dicker v. TuSimple Holdings, Inc. et al.*, 3:22-cv-01300-JES-MSB (S. D. Cal.). The complaint filed in the August 2022 Action alleges, among other things, that the Company and certain of its current and former directors and officers violated Sections 11 and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act by making materially false or misleading statements, or failing to disclose information it was required to disclose, regarding the Company’s autonomous driving technology. The complaint seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys’ fees.

On November 10, 2022, a second securities class action (the “November 2022 Action”) complaint was filed in the United States District Court for the Southern District of New York against the Company and certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Eric Tapia, Patrick Dillon, and James Mullen), and the underwriters who underwrote its IPO, on behalf of a putative class of stockholders who acquired its securities from April 15, 2021 through October 31, 2022. The November 2022 Action was originally captioned: *Woldanski v. TuSimple Holdings, Inc., et al.*, 1:22-cv-09625-AKH (S.D.N.Y.). The complaint in the November 2022 Action alleges, among other things, that the Company and certain of its current and former directors and officers violated Sections 11, 12(a), and 15 of the Securities Act and Sections 10(b) and 20(a) of the Exchange Act, by making false or misleading statements, or failing to disclose information it was required to disclose, regarding the Company related party transaction with Hydron and its sharing of confidential information and proprietary technology with Hydron without approval from the Board. The complaint seeks unspecified monetary damages on behalf of the putative class and an award of costs and expenses, including reasonable attorneys’ fees. The November 2022 Action has since been transferred to the Southern District of California: *Woldanski v. TuSimple Holdings, Inc., et al.*, 3:23-cv-00282-JES-MSB (S. D. Cal.).

On May 3, 2023, the Company made a motion to consolidate the August 2022 Action and the November 2022 Action, which was granted by the Court on July 20, 2023. At this time, the Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, lawsuit, which could be material. The plaintiffs have until October 2, 2023 to file a consolidated and amended complaint. The consolidated and amended complaint, and any future amended complaint, may include additional or alternate allegations regarding liability or alternate or additional claims for relief.

Shareholder Derivative Actions

On November 28, 2022, a shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Brad Buss, Karen Francis, Michelle Sterling, and Reed Warner) alleging, among other things, that certain of the Company's current and former directors and officers breached their fiduciary duties to the Company in connection with a related party transaction with Hydron: *Nusbaum v. Hou et al.*, 2022-1095-NAC (Del. Ch.). The shareholder derivative action also alleges breaches of fiduciary duties against certain of the Company's current and former directors and officers in connection with the restructuring of the Company's Board.

On December 15, 2022, a second shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Mo Chen, Cheng Lu, Patrick Dillon, Eric Tapia, James Mullen, Brad Buss, Charles Chao, Karen Francis, Michelle Sterling, Reed Werner, and Bonnie Zhang) alleging similar claims to the action filed on November 28, 2022: *Young v. Hou et al.*, 2022-1157-NAC (Del. Ch.). The second shareholder derivative action additionally asserts, among other things, claims regarding the safety of the Company's technology and alleged inadequacy of the Company's internal controls.

On March 6, 2023, a third shareholder derivative action was filed in the Delaware Court of Chancery by a stockholder purportedly on behalf of the Company against certain of its current and former directors and officers (Xiaodi Hou, Brad Buss, Mo Chen, Charles Chao, Karen Francis, Wendy Hayes, Cheng Lu, James Lu, Michael Mosier, Michelle Sterling, Reed Werner, and Bonnie Zhang), alleging similar claims to the actions filed on November 28, 2022 and December 15, 2022: *Wolfson v. Hou et al.*, 2023-0279-NAC (Del. Ch.). The stockholder has since purported to voluntarily dismiss her action.

On March 29, 2023, the Company made a motion to consolidate all of the above shareholder derivative actions. The Court granted the motion and consolidated the shareholder derivative actions on May 5, 2023. A consolidated complaint was filed on July 24, 2023 against Xiaodi Hou, Mo Chen, Brad Buss, Karen C. Francis, Reed Werner, and Hydron Inc., and TuSimple as nominal defendant, containing substantially the same claims as asserted in the complaint filed in *Nusbaum v. Hou et al.*, 2022-1095-NAC (Del. Ch.).

On August 17, 2023, the Delaware Court of Chancery entered an order staying the consolidated action through February 9, 2024 pending an investigation by a special litigation committee formed by the Company's Board of Directors to assess and determine whether the pursuit of derivative claims asserted in the consolidated action would be in the Company's best interests. The Board previously delegated to the SLC its authority to take all actions advisable, appropriate, and in the best interests of the Company and its shareholders with respect to the pending shareholder derivative litigation.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, lawsuit, which could be material.

Regulatory Investigations

Committee on Foreign Investments in the United States ("CFIUS")

The Company is cooperating with an inquiry by CFIUS concerning its compliance with the National Security Agreement ("NSA") entered into with the U.S. government as it relates to information shared by TuSimple U.S. with TuSimple's China-based businesses ("TuSimple China"), Hydron and Hydron's partners. If CFIUS concludes that information shared with TuSimple China, Hydron and Hydron's partners was shared in violation of the terms of the NSA or that the removal of our security director from the Board in November 2022 violated the terms of the NSA, it may impose a civil penalty on the Company. At this time, the Company is unable to estimate the likelihood of a negative outcome or the potential loss or range of loss associated with this matter. The Audit Committee, the Government Security Committee of the Board (the "Government Security Committee"), the Board, and the Company are committed to cooperating fully as discussions with CFIUS continue.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, investigation, which could be material.

Securities and Exchange Commission ("SEC")

As disclosed on November 7, 2022, in connection with the filing of the Company's Current Report on Form 8-K regarding the initial findings of the Audit Committee's internal investigation into the related party transaction with Hydron, the Company proactively reached out to the SEC and received an initial request for information from the SEC. Since the initial outreach, the Company and certain current and former directors and officers received subpoenas from the SEC requesting the production of Company documents. The Company is unable to estimate the likelihood of a negative outcome or the potential loss or range of loss associated with this matter. The Company has cooperated, and intends to continue to fully cooperate, with the SEC's investigation.

The Company is unable to estimate the potential loss or range of loss, if any, associated with this, or any similar, investigation, which could be material.

Note 9. Redeemable Convertible Preferred Stock and Preferred Stock Warrants, and Stockholders' Equity (Deficit)

In July 2020, the Company entered into a Sale and Purchase Agreement with Navistar, under which the Company issued 621,447 shares of Series D-1 redeemable convertible preferred stock at \$8.11 per share and a warrant to purchase shares issued in the Company's next equity financing for aggregate proceeds of \$5.0 million. The warrant was recorded at fair value, which equaled \$2.0 million, and was treated as a reduction of the proceeds allocated to the Series D-1 redeemable convertible preferred stock. The Company elected to accrete the shares to redemption value immediately and \$2.0 million of accretion was recorded within additional paid-in capital within the consolidated statements of redeemable convertible preferred stock and stockholders' equity (deficit). In March 2021, Navistar exercised warrants to purchase 9,477,073 shares of Series E redeemable convertible preferred stock at an exercise price of \$14.14 per share, resulting in proceeds of \$134.0 million.

In August 2020, the Company entered into a Sale and Purchase Agreement with TRATON, under which the Company agreed to issue 1,232,730 shares of Series D-1 redeemable convertible preferred stock at \$8.11 per share and a warrant to purchase shares issued in the Company's next equity financing for aggregate proceeds of \$10.0 million. The warrant was recorded at fair value, which equaled \$42.3 million, and was treated as a reduction of the proceeds allocated to the Series E redeemable convertible preferred stock. The excess of \$32.3 million in fair value allocated to the warrants over the cash proceeds received upon issuance was considered compensation paid to TRATON and recorded as research and development expense within the consolidated statements of operations. In February 2021, TRATON exercised warrants to purchase 4,331,644 shares of Series E-2 redeemable convertible preferred stock at an exercise price of \$11.31 per share, resulting in aggregate proceeds of \$49.0 million.

In November 2020, warrants issued in conjunction with the Company's Series D-1 financing in prior years were exercised and the Company issued 308,182 shares of Series D-1 redeemable convertible preferred stock at \$8.11 per share for aggregate proceeds of \$2.5 million.

In November 2020, the Company entered into a Sale and Purchase Agreement with new and existing investors to issue Series E redeemable convertible preferred shares at \$14.14 per share.

From December 2020 to January 2021, the Company issued an aggregate of 25,695,018 shares of Series E redeemable convertible preferred stock for aggregate proceeds of \$363.3 million. The Company incurred issuance costs of \$13.1 million, which were recorded as a reduction in the carrying value of the Series E redeemable convertible preferred shares. The Company recorded \$9.0 million of accretion to redemption value immediately upon the issuance within accumulated deficit and another \$4.1 million of accretion within additional paid-in capital in the consolidated statements of redeemable convertible preferred stock and stockholders' equity (deficit).

Upon the closing of the IPO, all shares of the Company's outstanding redeemable convertible preferred stock automatically converted into 120,534,419 shares of common stock. As of December 31, 2021, there were no shares of the Company's redeemable preferred stock issued and outstanding.

The following table is a summary of redeemable convertible preferred stock immediately prior to the conversion into common stock (in thousands, except share amounts and per share amounts):

Series	Shares Authorized	Shares Issued and Outstanding	Per Share Liquidation Preference	Aggregate Liquidation Preference	Per Share Initial Conversion Price	Net Carrying Value
A	20,000,000	20,000,000	\$ 0.3925	\$ 7,850	\$ 0.3925	\$ 7,850
A-2	8,218,203	8,218,203	—	—	7.3009	60,000
B-1	7,080,000	7,080,000	2.5000	17,700	2.5000	17,700
B-2	3,000,000	3,000,000	0.7667	2,300	0.7667	2,300
B-3	3,465,372	3,465,372	0.8657	3,000	0.8657	3,000
C	14,993,041	14,993,041	3.6941	55,386	3.6941	55,386
D-1	20,345,131	20,345,131	8.1121	165,042	8.1121	165,435
E	50,000,000	35,172,091	14.1401	497,336	14.1401	742,414
E-1	3,928,937	3,928,937	12.7261	50,000	12.7261	55,556
E-2	7,072,086	4,331,644	11.3121	49,000	11.3121	173,275
Total	138,102,770	120,534,419		\$ 847,614		\$ 1,282,916

Note 10. Stock-Based Compensation

2017 Share Plan

In April 2017, the Company adopted the 2017 Share Plan (the “2017 Plan”) under which employees, directors, and consultants may be granted various forms of equity incentive compensation at the discretion of the board of directors, including stock options, restricted shares, RSUs, and SVAs.

Stock options granted under the 2017 Plan have a contractual term of ten years and have varying vesting terms, but generally vest over a requisite service period of four years. The exercise price of the stock options granted may not be less than the par value of the common stock on the grant date for non-U.S. tax residents and may not be less than the fair market value of the common stock on the grant date for U.S. tax residents. Certain stock options contain a performance condition and are only exercisable subject to the grantee’s continuous service and the completion of an IPO. Such performance conditions were satisfied upon the closing of the Company’s IPO in April 2021.

In March 2021, the Company’s board of directors approved an amendment to the 2017 Plan to increase the number of shares of common stock reserved for issuance by 2,300,000 shares, for a total of 24,267,694 shares reserved.

The 2017 Plan was terminated in connection with the Company’s IPO in April 2021, and the Company will not grant any additional awards under the 2017 Plan. However, the 2017 Plan will continue to govern the terms and conditions of the outstanding awards previously granted under the 2017 Plan.

2021 Equity Incentive Plan

In March 2021, the board of directors adopted the 2021 Equity Incentive Plan (the “2021 Plan”), which became effective upon its approval by the board of directors, but for which no awards were eligible to be granted prior to the Company’s IPO in April 2021. The 2021 Plan provides for the grant of stock options, stock appreciation rights (“SARs”), restricted stock, and RSUs to the Company’s employees, directors, and consultants. The number of shares of the Company’s Class A common stock reserved for issuance under the 2021 Plan is 20,134,146 plus up to 19,892,067 shares of Class A common stock subject to awards under the Company’s 2017 Plan.

In December 2022, the board of directors and stockholders of the Company approved an amendment (the “2021 Plan Amendment”) to the 2021 Plan, subject to which the Company increased the number of shares of Class A Common Stock reserved for issuance under the 2021 Plan by an additional 13,000,000 shares. Additionally, the 2021 Plan Amendment increases the automatic share increase provision in the event that the aggregate number of shares of Class A Common Stock that are available for issuance under the plan as of the last day of a fiscal year (commencing with the last day of the 2023 fiscal year) is less than five percent (5%) of the company capitalization (as of such date) (the “Automatic Trigger”), then on the first day of each fiscal year of the Company commencing with the fiscal year beginning on January 1, 2024 and continuing for each fiscal year thereafter for the duration of the plan (ending on and including the fiscal year commencing on January 1, 2031), the aggregate number of shares of Class A Common Stock that may be issued under the plan will automatically increase in an amount equal to the lesser of (i) five percent (5%) of the company capitalization on the last day of the immediately preceding fiscal year or (ii) such number of shares of Class A Common Stock as may be determined by the board of directors prior to the date of the automatic increase. Furthermore, the 2021 Plan Amendment provides that in the event that the Automatic Trigger is not attained, the board of directors retains the authority in its sole discretion to, prior to the date that such automatic increase would have occurred had the Automatic Trigger been attained, increase the aggregate number of shares of Class A Common Stock that may be issued under the plan in any such fiscal year (commencing with the fiscal year beginning on January 1, 2024 and continuing for each fiscal year thereafter for the duration of the plan (ending on and including the fiscal year commencing on January 1, 2031)) by up to five percent (5%) of the company capitalization on the last day of the immediately preceding fiscal year as if the Automatic Trigger had been attained in accordance with its terms.

2021 Employee Stock Purchase Plan

In March 2021, the board of directors adopted the 2021 Employee Stock Purchase Plan (the “2021 ESPP”), which became effective upon the Company’s IPO in April 2021. The 2021 ESPP authorizes the issuance of shares of Class A common stock pursuant to purchase rights granted to employees. A total of 2,013,414 shares of the Company’s Class A common stock have been reserved for future issuance under the 2021 ESPP, subject to annual increases authorized by the board of directors; however, the aggregate number of shares of Class A common stock that may be approved for issuance under the 2021 ESPP in any given fiscal year may not exceed 1% of the total number of shares of common stock issued and outstanding on the last business day of the prior fiscal year.

During the year ended December 31, 2022, 249,831 shares were purchased under the 2021 ESPP at a weighted-average price of \$9.15 per share resulting in cash proceeds of \$2.3 million. During the years ended December 31, 2021 and 2022, the Company did not incur significant stock-based compensation expense under the 2021 ESPP.

Stock Options

A summary of the stock option activities, including the 2021 CEO Performance Award, for the year ended December 31, 2022 is as follows (in thousands, except share amounts, per share amounts, and years):

	Options Outstanding	Weighted- Average Exercise Price	Weighted- Average Remaining Life (Years)	Aggregate Intrinsic Value
Outstanding at December 31, 2021	7,684,778	\$ 12.91	9.04	\$ 188,722
Exercised	(980,696)	1.91		
Cancelled/Forfeited	(4,080,571)	14.10		
Outstanding at December 31, 2022	2,623,511	\$ 15.16	6.72	\$ 798
Vested and exercisable at December 31, 2022	1,654,756	\$ 8.17	6.06	\$ 489

The weighted-average grant-date fair values of stock options granted during the years ended December 31, 2020 and 2021 were \$3.61 and \$27.98 per share, respectively. There were no stock options granted during the year ended December 31, 2022. The aggregate intrinsic value of options exercised during the year ended December 31, 2020, 2021, and 2022 was \$3.7 million, \$11.1 million, and \$11.3 million, respectively.

As of December 31, 2022, there was \$11.6 million of unrecognized stock-based compensation expense related to unvested stock options, which is expected to be recognized over a weighted-average service period of 2.40 years.

Upon the closing of the Company's IPO in April 2021, the Company recognized \$18.8 million of stock-based compensation expense relating to stock options for which the time-based vesting condition has been satisfied or partially satisfied on that date, and for which the performance condition was satisfied upon the occurrence of the IPO.

The estimated grant-date fair value of the Company's stock-based option awards was calculated using the Black-Scholes option-pricing model, based on the following assumptions:

	Year Ended December 31,		
	2020	2021	2022
Risk-free interest rate	0.14% - 0.44%	0.33% - 1.25%	—
Expected dividend yield	—	—	—
Expected volatility	51.00% – 60.00%	50.00%	—
Expected term (in years)	2.21 – 6.06	4.05 - 6.22	—
Fair value of common stock	\$1.52 – \$8.24	\$32.18 - \$47.79	—

These assumptions and estimates were determined as follows:

Fair Value of Common Stock – Prior to the Company's IPO, the fair value of the common stock underlying the options was determined by the Company's board of directors given the absence of a public trading market, with input from management and valuation reports prepared by third-party valuation specialists. Stock-based compensation for financial reporting purposes is measured based on updated estimates of fair value when appropriate, such as when additional relevant information related to the estimate becomes available in a valuation report issued as of a subsequent date. Subsequent to the Company's IPO, the fair value of the Class A common stock is determined based upon the closing sale price per share of the Company's Class A common stock on the date of grant.

Risk-Free Interest Rate – The risk-free interest rate for the expected term of the options is based on the U.S. Treasury yield curve in effect at the time of the grant.

Expected Term – The expected term of options represents the period of time that options are expected to be outstanding. The Company's historical share option exercise experience does not provide a reasonable basis upon which to estimate an expected term due to a lack of sufficient data. For options granted to-date, the expected term is estimated using the simplified method. The simplified method calculates the expected term as the average of the time-to-vesting and the contractual life of the options.

Expected Volatility – As the Company does not have a sufficient trading history for its Class A common stock, the expected volatility was estimated by taking the average historic price volatility for industry peers, consisting of several public companies in the Company's industry that are either similar in size, stage of life cycle, or financial leverage, over a period equivalent to the expected term of the awards.

Expected Dividend Yield – The Company has never declared or paid any cash dividends and does not presently plan to pay cash dividends in the foreseeable future. As a result, an expected dividend yield of zero percent was used.

RSUs

The following table summarizes the activity related to RSUs for the year ended December 31, 2022:

	RSUs Outstanding	Weighted- Average Grant Date Fair Value per Share
Unvested and Outstanding at December 31, 2021	5,949,798	\$ 46.54
Granted	17,518,282	5.74
Vested	(2,495,482)	38.02
Cancelled	(3,125,125)	29.18
Unvested and outstanding at December 31, 2022	<u>17,847,473</u>	\$ 10.73
Vested and outstanding at December 31, 2022	<u>51,590</u>	\$ 45.29

SVAs

The following table summarizes the activity related to SVAs for the year ended December 31, 2022:

	SVAs Outstanding	Weighted- Average Grant Date Fair Value per Share
Unvested and Outstanding at December 31, 2021	315,559	\$ 5.29
Vested	(184,340)	4.67
Cancelled	(51,781)	2.97
Unvested and outstanding at December 31, 2022	<u>79,438</u>	\$ 8.24
Vested and outstanding at December 31, 2022	<u>—</u>	\$ —

As of December 31, 2022, there was \$144.7 million of unrecognized stock-based compensation expense related to RSUs and SVAs, which is expected to be recognized over a weighted-average service period of 2.47 years.

Upon the closing of the Company's IPO in April 2021, the Company recognized \$23.8 million of stock-based compensation expense relating to RSUs and SVAs for which the time-based vesting condition has been satisfied or partially satisfied on that date and for which the performance condition was satisfied upon the occurrence of the IPO.

2021 CEO Performance Award

In March 2021, included in the stock options discussed above, the Company granted 1,150,000 stock option awards to Cheng Lu, its former and current CEO, with an exercise price of \$14.14 per share and a contractual life of ten years that vest upon the attainment of both operational milestones (performance conditions) and market conditions, assuming continued employment as CEO through the vesting date (the "2021 CEO Performance Award"). In March 2022, the Company underwent a change in CEO and the 2021 CEO Performance Award was cancelled in connection with the separation of Cheng Lu as CEO. As a result, the Company reversed the historical stock-based compensation expense attributable to the 2021 CEO Performance Award of \$7.1 million.

In connection with the March 2022 separation of Cheng Lu as CEO, a total of 1,850,000 time-based stock options were modified, of which 440,000 were vested as of the modification date. The terms of the modification allowed for continued vesting of the unvested stock options during the twelve-month period following Cheng Lu's separation date on March 3, 2022 ("Transition Period"), subject to the provision of advisory services throughout the Transition Period. Upon the completion of such continuous services, all stock options subject to vesting would become vested and exercisable. Each of the modified stock options, including those vested and outstanding as of the modification date were to remain outstanding and exercisable until the earlier of: (x) the date on which any of the Company's outstanding stock options are terminated in connection with a corporate transaction, (y) the original expiration date applicable to such stock options, and (z) the second anniversary of the date on which the transition services with the Company are terminated. The Company determined the continuous service provisions were in-substance an acceleration of the unvested awards and the incremental cost related to the modified options was recorded immediately upon the separation date. Additionally, 175,000 outstanding and unvested RSUs were accelerated in full as of Cheng Lu's separation date. As a result of these modifications, the Company recorded incremental stock compensation expense of \$13.9 million during the year ended December 31, 2022.

2022 CEO Awards

In November 2022, Cheng Lu was reappointed as the Company's CEO. In connection with the re-appointment, on December 14, 2022, the Company granted Cheng Lu 3,425,000 RSUs that vest annually over a period of four years and 3,425,000 RSUs that vest annually over a period of four years upon the attainment of market-based milestones (together the "2022 CEO Awards"). The market-based vesting requirements will be satisfied if the Company's average closing price over a 60-day trailing period exceeds certain thresholds at any time on or before November 10, 2026, as follows: (a) 33% of the units of stock will vest if such average closing price equals or exceeds \$10.00, (b) 33% of the units of stock will vest if such average closing price equals or exceeds \$15.00, and (c) 33% of the units of stock will vest if such average closing price equals or exceeds \$20.00. The 2022 CEO Awards were granted in exchange for the cancellation and forfeiture of Cheng Lu's 1,850,000 outstanding stock options (inclusive of the 2021 CEO Performance Award, as discussed above).

During the year ended December 31, 2022, the Company did not recognize significant stock-based compensation expense for the 2022 CEO Awards. As of December 31, 2022, there was a total of \$8.9 million of unrecognized stock-based compensation expense, which will be recognized over a weighted-average service period of 3.51 years.

Restricted Share Awards

During 2020, the Company issued 1,899,680 shares of Class A common stock to two employees under a restricted share agreement at a grant date fair value of \$3.62 per share, totaling \$6.9 million. All of the shares were vested as of December 31, 2021 with the related compensation expense recorded as selling, general and administrative expense within the Consolidated Statements of Operations.

Stock-based Compensation Expense

Total stock-based compensation expense was as follows (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Research and development	\$ 917	\$ 71,201	\$ 75,260
Selling, general and administrative	11,846	51,395	23,407
Total stock-based compensation expense	<u>\$ 12,763</u>	<u>\$ 122,596</u>	<u>\$ 98,667</u>

The Company did not recognize any income tax benefits from stock-based compensation arrangements during the year ended December 31, 2020, 2021 and 2022 due to cumulative losses and valuation allowances.

Note 11. Income Taxes

Loss before provision for income taxes consisted of the following (in thousands):

	Year Ended December 31,		
	2020	2021	2022
U.S.	\$ (95,000)	\$ (673,941)	\$ (389,462)
Cayman Islands	(50,358)	—	—
Foreign	(32,512)	(58,732)	(82,583)
Loss before provision for income taxes	<u>\$ (177,870)</u>	<u>\$ (732,673)</u>	<u>\$ (472,045)</u>

The current and deferred provision for income taxes for the years ended December 31, 2020, 2021, and 2022 by the Company's applicable jurisdictions (i.e., U.S., Cayman Islands, and Foreign) is \$0 for all years.

Prior to February 2021, the Company was a Cayman Islands incorporated holding company and subject to taxation under the laws of Cayman Islands, for which there is no current tax regime. In February 2021, the Company completed a domestication pursuant to Section 388 of the Delaware General Corporation Law, becoming a Delaware corporation and no longer subject to the laws of the Cayman Islands (the "Domestication"). Following the Domestication, the U.S. federal income tax rate is the applicable statutory rate. The provision for income taxes differs from the amount computed by applying the U.S. statutory tax rate of 21% and Cayman Islands statutory tax rate of 0% as follows (in thousands):

	Year Ended December 31,		
	2020	2021	2022
Tax at statutory rate	\$ —	\$ (153,862)	\$ (99,129)
State and local taxes (net of federal tax benefit)	—	(3,531)	(3,011)
Tax rate change	—	11,317	—
Change in valuation allowances	38,984	99,129	109,041
Foreign tax rate differential	(30,633)	2,354	3,489
Research and development tax credits	(8,874)	(15,465)	(25,341)
Warrant fair market value adjustment	—	68,649	—
Section 162(m) limitation - officers compensation	—	6,672	2,005
Uncertain tax position reserves	364	1,800	3,185
Stock-based compensation	(354)	(16,344)	14,285
Other	513	(719)	(4,524)
Total	<u>\$ —</u>	<u>\$ —</u>	<u>\$ —</u>

The effective tax rate for 2020, 2021, and 2022 was 0%, primarily due to the valuation allowances recorded on U.S. and other local jurisdiction activities that the Company concluded do not meet the more likely than not criteria for realization.

The Company recognizes the benefit of tax positions taken or expected to be taken in its tax returns in the consolidated financial statements when it is more likely than not that the position will be sustained upon examination by authorities. Recognized tax positions are measured at the largest amount of benefit that is greater than 50% likely of being realized upon settlement. The total amount of unrecognized tax benefits ("UTBs") at December 31, 2022 was \$9.8 million. If recognized in the future, \$8.5 million of the UTBs would impact the effective tax rate (prior to consideration of valuation allowance). The Company does not believe its total amount of unrecognized tax benefits will significantly increase or decrease within 12 months of the balance sheet date.

A reconciliation of the beginning and ending balance to total unrecognized tax position is as follows (in thousands):

	Years Ended December 31,		
	2020	2021	2022
Unrecognized tax benefit, beginning of year	\$ 4,029	\$ 4,766	\$ 6,900
Decreases related to prior year tax positions	—	—	(538)
Increases related to current year tax positions	737	2,134	3,453
Unrecognized tax benefit, end of year	<u>\$ 4,766</u>	<u>\$ 6,900</u>	<u>\$ 9,815</u>

The Company classifies interest expense and penalties related to the underpayment of income taxes in the consolidated financial statements as income tax expense. As of December 31, 2020, 2021, and 2022 the Company recorded no accrued interest or penalties related to unrecognized tax benefits.

The Company is subject to tax examination in U.S. federal and state and other local country jurisdictions for tax years 2016 to the present.

Deferred income taxes reflect the net tax effects of temporary differences between the carrying amount of assets and liabilities for financial reporting purposes and the amounts used for income tax purposes. Significant components of the Company's deferred tax assets and liabilities are as follows (in thousands):

	As of December 31,	
	2021	2022
Deferred tax assets:		
Net operating loss carryforwards	\$ 155,088	\$ 196,670
Tax credit carryforwards	18,769	35,032
Lease liability	797	7,205
Stock-based compensation	8,887	6,404
Fixed assets and intangible assets	—	1,372
Capitalized research expenses	—	44,801
Other	2,479	4,748
Gross deferred tax assets	186,020	296,232
Valuation allowance	(184,892)	(289,901)
Net deferred tax assets	1,128	6,331
Deferred tax liabilities:		
Property, plant and equipment	395	—
Capital lease assets	733	6,331
Net deferred tax liabilities	1,128	6,331
Net deferred tax asset/(liability)	\$ —	\$ —

As of December 31, 2022, the Company had accumulated federal and state net operating loss carryforwards of \$659.3 million and \$249.3 million, respectively. Of the \$659.3 million of federal net operating losses ("NOL"), \$652.3 million is carried forward indefinitely and \$7 million of NOL will expire in 2037. The \$249.3 million of state net operating loss carryforwards will begin to expire in 2037 and \$40.3 million of California state net operating losses are not more-likely-than-not to be sustained upon examination by the relevant taxing authority. As of December 31, 2022, the Company had foreign net operating loss carryforwards of \$301.7 million that begin to expire between 2023 and 2032.

As of December 31, 2022, the Company had a U.S. federal and state research and development tax credit carryforward resulting in a deferred tax asset of \$44.9 million, of which \$32.6 million will expire between 2035 and 2042 and \$12.3 million does not expire.

The Company recorded a valuation allowance to reflect the estimated amount of certain U.S. federal and state, and other local jurisdictions' deferred tax assets that, more likely than not, will not be realized. In making such a determination, the Company evaluates a variety of factors including the Company's operating history, accumulated deficit, and the existence of taxable or deductible temporary differences and reversal periods. The net change in total valuation allowance for the years ended December 31, 2021 and 2022 was an increase of \$100.0 million and an increase of \$105.0 million, respectively. The 2021 and 2022 valuation allowance increases were both driven primarily by U.S. federal and state, and other local jurisdictions' NOL carryforwards that are not expected on a more likely than not basis to be realized.

The Company's ability to utilize the net operating losses and tax credit carryforwards is subject to limitations in the event of an ownership change as defined in Section 382 of the Internal Revenue Code ("IRC") of 1986, as amended, and similar state law. In general, an ownership change occurs if the aggregate share ownership of certain stockholders increases by more than 50 percentage points over such stockholders' lowest percentage ownership during the testing period. While the Company incurred multiple ownership changes and its NOL and tax credit carryforwards are subject to Section 382 limitations, the Company does not expect resulting limitations on its ability to utilize NOLs or other tax attributes once it achieves profitability. Due to the existence of the valuation allowance, limitations created by future ownership changes, if any, related to the Company's operations in the United States will not impact the Company's effective tax rate.

Under the Corporate Income Tax Law ("CIT Law") in the PRC, Foreign Investment Enterprises and domestic companies are subject to corporate income tax at a uniform rate of 25%. The Company also has subsidiaries that qualify for the High and New-Technology Enterprise program, which has a preferential CIT rate of 15%.

Note 12. Net Loss Per Share Attributable to Common Stockholders

Basic net loss per share attributable to common stockholders is computed by dividing the net loss attributable to common stockholders by the weighted-average shares of common stock outstanding during the period. Diluted loss per share attributable to common stockholders is the same as basic net loss per share attributable to common stockholders for all years presented because the effects of potentially dilutive items were antidilutive given the Company's net loss in each period presented.

The following table presents the calculation of basic and diluted net loss per share attributable to common stockholders (in thousands, except share and per share amounts):

	Years Ended December 31,		
	2020	2021	2022
Numerator:			
Net loss	\$ (177,870)	\$ (732,673)	\$ (472,045)
Less: Accretion of redeemable convertible preferred stock	(20,959)	(4,135)	—
Net loss attributable to common stockholders, basic and diluted	<u>\$ (198,829)</u>	<u>\$ (736,808)</u>	<u>\$ (472,045)</u>
Denominator:			
Weighted-average shares used in computing net loss per share, basic and diluted	<u>58,929,271</u>	<u>169,080,392</u>	<u>224,164,514</u>
Net loss per share:			
Net loss per share attributable to common stockholders, basic and diluted	<u>\$ (3.37)</u>	<u>\$ (4.36)</u>	<u>\$ (2.11)</u>

The following outstanding potentially dilutive ordinary share equivalents have been excluded from the computation of diluted net loss per share attributable to common stockholders for the periods presented due to their antidilutive effect:

	Years Ended December 31,		
	2020	2021	2022
Redeemable convertible preferred stock	102,074,703	—	—
Options to purchase common stock	13,295,497	7,684,778	2,623,511
RSUs subject to future vesting	1,100,000	5,949,798	17,847,473
SVAs subject to future vesting	3,653,146	315,559	79,438
Redeemable convertible preferred stock warrants	16,459,024	—	—
Early exercised options subject to future vesting	—	40,000	—
Common stock contingently issuable under ESPP	—	31,514	439,415
Total	<u>136,582,370</u>	<u>14,021,649</u>	<u>20,989,837</u>

Note 13. Segment and Geographic Information

Segment Information

The primary segment performance measure used by the CODM is Adjusted EBITDA, which is defined as loss from operations, adjusted to exclude depreciation and amortization, stock-based compensation expense, non-recurring restructuring expenses, and finance lease interest expense included within cost of sales. The CODM does not evaluate operating segments using asset information and, accordingly, the Company does not disclose the asset information by segment.

The following table provides information about the Company's segments and a reconciliation of total segment Adjusted EBITDA to consolidated loss before provision for income taxes (in thousands):

	Years Ended December 31,		
	2020	2021	2022
Segment Adjusted EBITDA:			
U.S.	\$ (124,314)	\$ (220,370)	\$ (259,109)
APAC	(28,971)	(58,517)	(89,544)
Total Segment Adjusted EBITDA	(153,285)	(278,887)	(348,653)
Reconciling items:			
Stock-based compensation expense ⁽¹⁾	(12,763)	(122,596)	(101,718)
Depreciation and amortization ⁽¹⁾	(7,683)	(9,450)	(11,264)
Restructuring expenses	—	—	(26,855)
Interest expense included within cost of sales	(333)	(418)	(573)
Loss from operations	(174,064)	(411,351)	(489,063)
Change in fair value of related party convertible loan	(5,556)	—	—
Change in fair value of warrants liability	1,816	(326,900)	—
Gain on loan extinguishment	—	4,183	—
Interest income	454	1,563	16,906
Other income (expense), net	(520)	(168)	112
Loss before provision for income taxes	<u>\$ (177,870)</u>	<u>\$ (732,673)</u>	<u>\$ (472,045)</u>

(1) Excludes amounts related to restructuring events, which are reflected in the "Restructuring expenses" line item.

Geographic Information

The following table presents long-lived assets, net by geographic area (in thousands):

	As of December 31,	
	2021	2022
U.S.	28,345	42,047
APAC	7,708	19,988
Total long-lived assets, net ⁽¹⁾	<u>36,053</u>	<u>62,035</u>

(1) Long-lived assets, net excludes intangible and financial assets.

Note 14. Related Party Transactions

During the year ended December 31, 2021, the Company paid off all of its outstanding related-party loans, including short-term, unsecured, interest free loans of approximately \$0.6 million due to its executive chairman and approximately \$3.7 million due to Jinzhuo Hengbang Technology (Beijing) Co., Ltd. ("Jinzhuo Hengbang"), an affiliated company of Sina Corporation, the ultimate parent company of one of the Company's investors. Additionally, the Company received the refund of the guarantee deposit of \$3.7 million paid to Sina Corporation in connection with the loans borrowed by the Company from Jinzhuo Hengbang.

As previously disclosed by the Company in its Current Report on Form 8-K filed on October 31, 2022, based on information obtained in connection with an ongoing internal investigation by the Audit Committee of the Company's Board (the "Audit Committee"), during 2021, Company employees spent paid hours working on matters for Hydron Inc. ("Hydron") and such paid hours had an estimated value of less than \$300,000. The Company also believes that during 2022, in connection with its evaluation of Hydron as a potential OEM partner, the Company shared confidential information with Hydron and its partners before entering into relevant non-disclosure and other cooperation agreements. After the information was disclosed, the Company entered into a non-disclosure agreement with Hydron that covered the information. Mr. Mo Chen, one of the Company's co-founders and current Executive Chairman, is a founder, director, and chief executive officer of Hydron and he has an equity interest in the Company of greater than 10%. This related party transaction and the evaluation of Hydron as a potential OEM partner was not presented to, or approved by, the Audit Committee as required by Company policies.

The Company's internal review regarding the information shared with Hydron is still ongoing and, based upon the facts from the review to date, the Company believes that the information shared by TuSimple's U.S.-based businesses ("TuSimple U.S.") was not source code, was not the confidential information of its partners or suppliers and was consistent with information it normally shares with its vendors. The Company is not currently partnering with, or party to any agreement with Hydron.

Note 15. Restructuring and Related Charges

On December 15, 2022, the Board authorized a broad restructuring plan to rebalance the Company's cost structure in alignment with its strategic priorities (the "Restructuring Plan"). In connection with the Restructuring Plan, the Company incurred costs consisting primarily of cash expenditures for employee transition, notice period and severance payments, employee benefits and related costs, as well as non-cash charges of certain non-current assets.

The following tables present restructuring and related charges associated with the Restructuring Plan, by line item on the consolidated statement of operations (in thousands):

	Year Ended December 31, 2022
Research and development	\$ 23,864
Selling, general and administrative	2,991
Total restructuring and related cost	\$ 26,855

The following table provides the components of and changes in the accrued restructuring and related charges during the year ended December 31, 2022 (in thousands):

	Severance and Other Termination Benefits	Long-Lived Asset Costs ⁽¹⁾	Stock-based Compensation ⁽²⁾	Total
Balance as of December 31, 2021	\$ —	\$ —	\$ —	\$ —
Charges	11,759	18,147	(3,051)	26,855
Cash payments	(1,568)	—	—	(1,568)
Non-cash adjustments	—	(18,147)	3,051	(15,096)
Balance as of December 31, 2022	\$ 10,191	\$ —	\$ —	\$ 10,191

(1) Primarily related to the impairment or write-off of property plant and equipment and finance lease ROU assets.

(2) Related to reversal of stock-based compensation expense due to modification of equity awards.

Restructuring and related charges incurred by segment were as follows:

	Year Ended December 31, 2022
U.S.	\$ 19,921
APAC	6,934
Total restructuring and related cost	\$ 26,855

Note 16. Subsequent Events

Nasdaq

In May 2023, the Company received a notice from The Nasdaq Stock Market LLC ("Nasdaq") indicating that, as a result of the Company not having timely filed its Quarterly Report on Form 10-Q for the period ended September 30, 2022, its Annual Report on Form 10-K for the fiscal year ended December 31, 2022, and its Quarterly Report on Form 10-Q for the period ended March 31, 2023, the Company is not in compliance with Nasdaq Listing Rule 5250(c)(1) and Nasdaq has determined to deny the Company's request for continued listing on Nasdaq. The Company requested, and Nasdaq granted, a hearing before the Nasdaq Hearings Panel (the "Panel") to appeal Nasdaq's delisting determination.

On June 22, 2023, the Company appeared before the Panel and, on July 6, 2023, the Company received a notice from Nasdaq indicating that based on the plan of compliance presented by the Company at its hearing, the Panel has granted the Company's request for continued listing on Nasdaq.

The Panel has granted the Company an extension until September 30, 2023 (the “Compliance Date”) to file with the SEC its Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 2022, its Annual Report on Form 10-K for the fiscal year ended December 31, 2022, its Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2023 and its Quarterly Report on Form 10-Q for the fiscal quarter ended June 30, 2023 (the “Delayed Reports”), subject to specified deadlines for each Delayed Report. On July 17, 2023, the Company filed with the SEC its Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 2022. The Company intends to file the other Delayed Reports as soon as practicable and on or before the Compliance Date.

Restructuring

On May 16, 2023, the Board authorized an additional restructuring plan to further align the Company’s cost structure with its strategic priorities resulting in an additional reduction in the Company’s workforce by approximately 300 employees (the “Additional Restructuring Plan”). Following the Additional Restructuring Plan, the Company’s global full-time employees (“FTEs”) are approximately 750 FTEs, including approximately 250 FTEs in the U.S. operations.

The Company estimates that it will incur one-time charges of approximately \$7.0 million to \$9.0 million in connection with the Additional Restructuring Plan, consisting primarily of cash expenditures for employee transition, notice period and severance payments, employee benefits and related costs, as well as non-cash charges of certain non-current assets.

The foregoing estimates of the charges the Company expects to incur under the Additional Restructuring Plan are subject to assumptions and actual charges may differ from such estimates.

Strategic Alternatives

On June 28, 2023, the Company announced that it is evaluating strategic alternatives for its U.S.-based business and engaged Perella Weinberg Partners as a financial advisor to explore possible transactions.

ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURES

The information required by this Item 9 was previously reported in the Company’s Current Reports on Form 8-K that were filed with the Securities and Exchange Commission on November 21, 2022 and May 11, 2023.

ITEM 9A. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

Our management, with the participation and supervision of our Chief Executive Officer and our Chief Financial Officer, has evaluated the effectiveness of our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Exchange Act) as of the end of the period covered by this Annual Report on Form 10-K. Based on such evaluation, our Chief Executive Officer and Chief Financial Officer have concluded that as of such date, our disclosure controls and procedures were not effective due to the material weaknesses in our internal control over financial reporting described below. In light of this fact, our management has performed additional analysis, investigations, and other post-closing procedures and has concluded that, notwithstanding the material weaknesses in our internal control over financial reporting, the consolidated financial statements for the periods covered by and included in this Annual Report on Form 10-K fairly present, in all material respects, our financial position, results of operations, and cash flows for the periods presented in conformity with GAAP.

Management’s Report on Internal Control over Financial Reporting

Management is responsible for establishing and maintaining adequate internal control over financial reporting for the Company. With the participation of the Chief Executive Officer and the Chief Financial Officer, management conducted an evaluation of the effectiveness of our internal control over financial reporting as of December 31, 2022 based on the guidelines established in the Internal Control-Integrated Framework (2013 framework) issued by the Committee of Sponsoring Organizations of the Treadway Commission (COSO). Based on that evaluation, our management concluded that our internal control over financial reporting was not effective as of December 31, 2022 because of the material weaknesses described below. In addition, UHY LLP, our independent registered public accounting firm, provided an attestation report on our internal control over financial reporting as of December 31, 2022, which is included in Item 8 of this Annual Report on Form 10-K.

Material Weaknesses in Internal Control over Financial Reporting

In connection with our evaluation for the year ended December 31, 2022, we identified material weaknesses in our internal control over financial reporting resulting from (i) the unexpected removal of all the independent directors of our Board in November 2022, including all of the members of our Audit Committee, by our controlling shareholders and (ii) a lack of understanding among Company personnel regarding the Company's policy on the identification, approval, and disclosure of related party transactions. As a result, (i) the removal of the independent directors and dissolution of the Audit Committee impacted the oversight and monitoring of required internal controls and procedures and (ii) we did not maintain effective controls over the identification and disclosure of related party transactions. A material weakness is a deficiency, or a combination of deficiencies, in internal control over financial reporting such that there is a reasonable possibility that a material misstatement of our financial statements will not be prevented or detected. Other than our related party transaction with Hydron disclosed above, we are not party to any related party transactions as of December 31, 2022.

Remediation Plan

We have commenced measures to remediate the identified material weaknesses, including:

- Appointing independent directors to the Board in mid-December 2022, reconstituting the Audit Committee on December 15, 2022, and appointing additional independent directors to the Board in 2023;
- Resuming meetings of our Board and committees, including with respect to effective oversight of financial reporting and monitoring of internal controls and procedures;
- Providing targeted training to certain personnel regarding the scope and application of the Company's policy on identification and reporting of related party transactions; and
- Further developing, refining, and implementing processes and documentation procedures related to the identification and reporting of related party transactions.

While we have initiated a plan to remediate these material weaknesses, these actions and planned actions are subject to ongoing evaluation by management and will require testing and validation of design and operating effectiveness of internal controls over financial reporting over future periods. We are committed to the continuous improvement of our internal control over financial reporting and intend to continue to take actions necessary to remediate deficiencies in our internal control over financial reporting.

Changes in Internal Control over Financial Reporting

Except as discussed above, there was no change in our internal control over financial reporting that occurred during the year ended December 31, 2022, which has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Limitations on the Effectiveness of Controls

The effectiveness of any system of disclosure controls and procedures and internal control over financial reporting, including ours, is subject to inherent limitations, including the exercise of judgment in designing, implementing, operating, and evaluating the controls and procedures, and the inability to eliminate misconduct completely. Accordingly, in designing and evaluating the disclosure controls and procedures, management recognizes that any system of internal control over financial reporting, including ours, no matter how well designed and operated, can only provide reasonable assurance, not absolute assurance of achieving the desired control objectives. In addition, the design of disclosure controls and procedures must reflect the fact that there are resource constraints and that management is required to apply its judgment in evaluating the benefits of possible controls and procedures relative to their costs. Moreover, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate. We intend to continue to monitor and upgrade our internal controls as necessary or appropriate for our business but cannot assure you that such improvements will be sufficient to provide us with effective internal control over financial reporting.

ITEM 9B. OTHER INFORMATION

None.

ITEM 9C. DISCLOSURE REGARDING FOREIGN JURISDICTIONS THAT PREVENT INSPECTIONS

Not applicable.

PART III

ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE

DIRECTORS AND EXECUTIVE OFFICERS

The following table sets forth information regarding the Company's current directors and executive officers. There is no family relationship between or among any of the current directors or executive officers, and the Company is not aware of any arrangement or understanding between any current director or executive officer and any other person pursuant to which he or she was elected to his or her current position, except as described under "Voting Agreement" below.

Name	Age	Position(s) with TuSimple
Mo Chen	39	Executive Chairman of the Board
Cheng Lu	40	Chief Executive Officer and Director
Eric Tapia	46	Chief Financial Officer
Wendy Hayes	53	Director
James Lu	41	Director
Michael Mosier	50	Director
Tyler McGaughey	44	Director
Zhen Tao	42	Director

Set forth below is a brief description of the background and business experience of our current directors and executive officers:

Mo Chen is our co-founder and Executive Chairman of the Company's Board. Previously, Mr. Chen served as the Company's Executive Chairman from September 2020 to June 2022 and as a member of the Board from 2015 to June 2022. Mr. Chen served as the Company's Chief Executive Officer from our inception in 2015 to September 2020. Prior to founding the Company, Mr. Chen served as founder and chief executive officer at Deep Blue Brothers, an online gaming platform. Prior to that, he served as a founder of startups in the fields of traditional and online advertising and used car online marketplaces. Mr. Chen is also a founder of Hydron Inc. He has more than 12 years of entrepreneurship and management experience. Mr. Chen is a Canadian citizen. We believe that Mr. Chen should serve as a member of our Board because he is experienced in founding, leading, and managing technology companies.

Cheng Lu has served as our Chief Executive Officer and as a director since November 2022 and served as the Company's President from January 2019 to March 2022, as Chief Executive Officer from September 2020 to March 2022, and as a member of the Board from June 2020 to March 2022. Cheng Lu also served as the Company's Chief Financial Officer from January 2019 to December 2020. Cheng Lu has more than 15 years of experience in operations, strategy, and corporate finance. Prior to joining the Company, from 2016 to 2019, Cheng Lu served as co-founder and chief operating officer of KCA Capital Partners, a growth equity investment fund. Prior to KCA Capital Partners, Cheng Lu was a private equity investor. Cheng Lu holds a B.S. in computer science and economics from the University of Virginia, and an M.B.A. from Harvard Business School. Cheng Lu is an American citizen. We believe that Cheng Lu should serve as a member of our Board because of his leadership experience with our company and his background in corporate finance and strategy.

Eric Tapia has served as our Chief Financial Officer since December 2022, our interim Chief Financial Officer from June 2022 until December 2022, and our Vice President, Global Controller from May 2021 until June 2022. Mr. Tapia brings more than 20 years of experience working in finance, controllership, audit, and interacting with public companies' Boards and Audit Committees. Before TuSimple, Mr. Tapia was the VP Controller of W.W. Grainger, Inc. (NYSE: GWW), a supplier and distributor of maintenance, repair, and operating products. In this role, Mr. Tapia led large multi-country teams and was responsible for Grainger's global controllership and tax operations, financial reporting (internal/managerial, SEC reporting, external audits), financial operations, and internal controls. Previously, Mr. Tapia served as Grainger's Vice President, Internal Audit, and before joining Grainger in 2010, Mr. Tapia was an audit partner with KPMG. Mr. Tapia is a Certified Public Accountant and holds an accounting degree from the University of Puerto Rico and an M.B.A. from Duke University's Fuqua School of Business.

Wendy Hayes has served as a director on our Board since December 2022. Ms. Hayes brings to TuSimple extensive financial and business oversight experience. Ms. Hayes has served as an independent director of SharkNinja Inc. since July 2023, Apollomics Inc. since March 2023, SciClone Pharmaceuticals (Holdings) Limited since March 2021, Gracell Biotechnologies Inc. since January 2021, iHuman Inc. since October of 2020, Burning Rock Biotech Limited since June 2020, and Tuanche Limited since November 2018. Between May 2013 and September 2018, Ms. Hayes served as the inspections leader at the Public Company Accounting Oversight Board in the United States. Prior to that, Ms. Hayes was an audit partner at Deloitte (China), having worked in various Deloitte global offices. Ms. Hayes is a certified public accountant in the United States (California) and in China. We believe that Ms. Hayes is qualified to serve as a member of our Board because of her extensive financial and accounting expertise and business oversight experience.

James Lu has served as a director on our Board since December 2022. James Lu is the founding partner of Joffre Capital, a global investment firm focused on consumer software, technology and internet businesses, where he has served since June 2017. James Lu served as the director, chairman, and chief executive officer of Life Concepts Holdings Limited, an investment company, since October 2018. James Lu has served as the Chairperson of Grindr (NSYSE: GRND) since June 2020. James Lu also has served as a Director of Fusion Media Limited, an Internet publishing company, since February 2021, and a Director of Global Commerce Technology Limited, a software development company, since February 2022. James Lu previously served as the Vice President of content ecosystems at Baidu, Inc. from 2015 to 2017, and as the Global Head of Amazon Marketing Services (now Amazon Advertising) from 2011 to 2015. James Lu was a founding member and director of product management at Chegg, Inc., a textbook rental company, from 2007 to 2011. In 2006, James Lu founded Yoolin, a social network, and served as its Chief Executive Officer from 2006 to 2007. James Lu received his Bachelor of Science and Master of Science in Electrical Engineering and Computer Science from the University of Michigan. We believe that James Lu is qualified to serve as a member of our Board because of his business experience, technical knowledge, and experience in the technology industry.

Michael Mosier has served as a director on our Board since December 2022. Mr. Mosier is a co-founder of Arktouros PLLC, a law firm focused on emergent technology issues, where he has served since January 2022. Mr. Mosier has vast experience in the federal government across national security-related roles, including at the U.S. Department of Treasury, U.S. Department of Justice, and White House National Security Council. Since August 2021, Mr. Mosier has served as the general counsel of Espresso Systems. Prior to that, Mr. Mosier served as the Acting Director, from April 2021 to August 2021, Deputy Director/Digital Innovation Officer, from February 2020 to March 2021, and Chief of Strategic Advancement, from April 2018 to June 2019, at the Financial Crimes Enforcement Network, U.S. Department of the Treasury. Mr. Mosier also served as the Counselor (Cyber Security & Emerging Technology) to the Deputy Secretary of the U.S. Department of Treasury, from March 2021 to April 2021. Mr. Mosier served as the Chief Technical Counsel at Chainalysis Inc., from June 2019 to February 2020. Mr. Mosier also served as Associate Director of the Office of Foreign Assets Control, U.S. Department of the Treasury, from June 2015 to April 2018. We believe that Mr. Mosier is qualified to serve as a member of our Board because of his extensive experience in national and investment security issues.

J. Tyler McGaughey has served as a director on our Board since March 2023. Mr. McGaughey is a partner at a law firm in Washington, D.C., where he advises investment funds and companies on compliance with national security laws and regulations, with a particular focus on matters involving CFIUS. Prior to joining his law firm, Mr. McGaughey served as the Deputy Assistant Secretary for Investment Security at the U.S. Department of the Treasury from October 2019 to January 2021, where he was responsible for managing CFIUS's day-to-day operations. Prior to joining Treasury, from November 2014 to October 2019, Mr. McGaughey served at the U.S. Attorney's Office as an Assistant U.S. Attorney in the Eastern District of Virginia, where he prosecuted a wide range of criminal offenses in federal district court. During his final year at the U.S. Attorney's Office, Mr. McGaughey was detailed to the White House Counsel's Office, where he served as an Associate Counsel to the President. At the White House, Mr. McGaughey worked on congressional oversight and national security matters. Before finishing his law degree, from 2001 to 2006, Mr. McGaughey served as an infantry officer in the Marine Corps. Mr. McGaughey received his Bachelor's in Arts from the University of Virginia and his Juris Doctor from Yale University. We believe that Mr. McGaughey is qualified to serve as a member of our Board because of his extensive government service and deep expertise in regulatory compliance.

Zhen Tao has served as a director on our Board since March 2023. Ms. Tao has served as a Senior Partner at Third Square Capital Management, an investment firm focused on global consumer-driven, long-term growth companies since April 2019. Prior to that, from February 2012 to March 2017, Ms. Tao worked as a managing director for Summitview Capital and, from October 2010 to January 2012, as a partner for Ariose Capital. Ms. Tao also serves as the South Pasadena City Treasurer where she oversees the city's investment portfolio and provides independent oversight for its finances. Ms. Tao received her Bachelor's Degree in Economics from the Wharton School of the University of Pennsylvania. We believe that Ms. Tao is qualified to serve as a member of our Board because of her extensive investment management, investment banking, and capital markets experience.

Voting Agreement

As previously disclosed, on November 9, 2022, the Company's stockholders White Marble LLC and White Marble International Limited (collectively, the "Principal Parties") (i) granted Mr. Mo Chen, who is currently the Executive Chairman of the Board, an irrevocable proxy (the "Proxy") pursuant to which Mr. Chen has the right to exercise, in his sole discretion, each shareholder's rights to vote, consent, or waive any rights attaching to all equity securities of the Company beneficially owned by the Principal Parties, including with respect to election of directors, and (ii) entered into a voting agreement (the "Voting Agreement") with Mr. Chen, pursuant to which the Principal Parties will vote, or cause to be voted, all equity securities of the Company beneficially owned by the Principal Parties as directed by Mr. Chen at any regular or special meeting of the Company's stockholders or in connection with any written consent of the Company's stockholders. The Proxy will remain in effect until the earlier to occur of (i) the two-year anniversary of the date of the Proxy and (ii) mutual agreement among Mr. Chen and the Principal Parties in writing to terminate the Proxy. The Voting Agreement will be terminated upon mutual agreement among Mr. Chen and the Principal Parties. Based on a joint Schedule 13D filed on November 15, 2022 by Mr. Chen, THC International Limited, Mo Star LLC, Brown Jade Holding Limited, and Gray Jade Holding Limited, no monetary consideration was given or received by any party in exchange for executing the Proxy or the Voting Agreement.

Section 16(a) Beneficial Ownership Reporting Compliance

Compliance with Section 16(a) of the Exchange Act requires the Company's executive officers and directors, and persons who own more than 10% of a registered class of its equity securities, to file reports of ownership and changes in ownership with the SEC. Officers, directors, and greater than 10% stockholders are required by SEC rules to furnish the Company with copies of all Section 16(a) forms they file.

Based solely on a review of the copies of such forms furnished to the Company, the Company believes that during 2022 all Section 16(a) filing requirements applicable to its officers, directors, and greater than 10% stockholders were in compliance with Section 16(a).

CORPORATE GOVERNANCE

Corporate Governance Profile

Our Board believes that our corporate governance structure aligns the Company's interests with those of our stockholders. Notable features of our corporate governance structure that evidence our commitment to good corporate governance include the following, among others:

- our Board is not staggered, with each of our directors subject to re-election annually;
- of the seven persons who serve on our Board, five, or 71% of our directors, have been determined by us to be independent for purposes of the NASDAQ's corporate governance listing standards and Rule 10A-3 under the Exchange Act;
- we have a clawback provision in our equity compensation plan and equity award agreements;
- we prohibit officers, directors, and employees from engaging in short sales and hedging of our securities;
- we restrict the holding of our securities in margin accounts or otherwise pledging our securities as collateral by our officers, directors, and employees, with limited exceptions;
- we do not use corporate funds for political or charitable donations; and
- we are committed to diversity, with 30% of our Board being female and 71% of our Board consisting of underrepresented groups.

Code of Conduct and Corporate Governance Guidelines

Our Board has adopted a Code of Conduct and Corporate Governance Guidelines (collectively, the "Governance Documents"). Both documents apply to all of our employees, officers, and directors, as well as all of our contractors, consultants, suppliers, and agents in connection with their work for us. Our Governance Documents address, among other things, legal compliance, conflicts of interest, corporate opportunities, protection and proper use of Company assets, confidential and proprietary information, integrity of records, and compliance with accounting principles. The full text of the Governance Documents has been posted on our website at www.ir.tusimple.com. We intend to disclose future amendments to, or waivers of, the Governance Documents, as and to the extent required by SEC regulations, at the same location on our website identified above or in public filings.

Transactions in the Company's Securities

Our Board has adopted an Insider Trading Policy, which applies to all of our directors, officers, employees, and agents (such as consultants and independent contractors), as well as certain family members, economic dependents, and any other individuals or entities whose transactions in securities such individual influences, directs, or controls. Under this policy, such individuals are prohibited from transacting in publicly-traded options, such as puts and calls, and other derivative securities with respect to TuSimple's securities, and such prohibition extends to any hedging or similar transaction designed to decrease the risks associated with holding TuSimple securities. Stock options, restricted stock units, restricted stock, stock appreciation rights, and other securities issued pursuant to TuSimple's benefit plans or other compensatory arrangements with TuSimple are not subject to this prohibition. In addition, for the three years following the date of the closing of our initial public offering, individuals subject to the Insider Trading Policy may (i) pledge up to 15% of the total number of shares of our common stock that such individuals beneficially own as collateral for loans and (ii) hold up to 15% of the total number of shares of our common stock that such individuals own in margin accounts.

Corporate Responsibility and Diversity Employee Well-Being

We pride ourselves on the talent, passion, and dedication of our employees, who are united in our goal to revolutionize the global freight market.

Apart from culture and career development, we offer a robust benefits package. This package includes vacation days, paid parental leave, 401(k) matching contributions, performance bonuses, and a premier health plan for employees and their dependents. We also regularly survey and host roundtables with our employees to better understand their needs and perspectives.

Diversity

Diversity is one of our company core values, and we believe in creating an inclusive Board. Our Board of Directors values having a board that reflects diverse perspectives, including those based on gender, ethnicity, skills, experience at policy-making levels in areas that are relevant to the Company's activities, and functional, geographic, or cultural backgrounds. The following Board Diversity Matrix presents our Board diversity statistics in accordance with Nasdaq Rule 5606, as self-disclosed by our directors. Our Board satisfies the minimum objectives of Nasdaq Rule 5605(f)(3) by having at least one director who identifies as female and at least one director who identifies as a member of an Underrepresented Minority (as defined by Nasdaq Rules). As we pursue future Board recruitment efforts, our Nominating and Corporate Governance Committee will continue to seek out candidates who can contribute to the diversity of views and perspectives of the Board.

Board Diversity Matrix (as of August 8, 2023)

Part I: Gender Identity	Number of Directors
Female	2
Male	5
Non Binary	0
Did Not Disclose Gender	0
Part II: Demographic Background	
African American or Black	0
Alaskan Native or Native American	0
Asian	5
Hispanic or Latinx	0
Native Hawaiian or Pacific Islander	0
White	2
Two or More Races or Ethnicities	0
Did Not Disclose Demographic Background	0
Total Number of Directors	7

Our Board of Directors

Board Leadership Structure

Our Board is responsible for monitoring and assessing strategic risk exposure. Our executive officers are responsible for the day-to-day management of the material risks we face. Our Board administers its oversight function directly as a whole through various standing committees of our Board that address risks inherent in their respective areas of oversight. For example, our Audit Committee is responsible for overseeing the management of risks associated with our financial reporting, accounting, auditing matters, and cybersecurity risks; our Compensation Committee oversees the management of risks associated with our compensation policies and programs; our Nominating and Corporate Governance committee oversees the management of risks associated with director independence, conflicts of interest, composition, and organization of our Board, and director succession planning; and our Government Security Committee oversees the management of risks related to security and compliance with the NSA.

Our Board oversees our business and monitors the performance of the Company's management. The Board does not involve itself in day-to-day operations. The directors keep themselves informed by discussing matters with the Chief Executive Officer, other key executives, and our external advisors, such as legal counsel, outside auditors, investment bankers, and other consultants, by reviewing the reports and other materials provided by management and by participating in Board and committee meetings.

Our Board currently consists of seven members. Our directors hold office until their successors have been elected and qualified or appointed, or the earlier of their death, resignation, or removal.

Meetings of the Board of Directors

The full board of directors met fourteen times during the year ended December 31, 2022. No director attended fewer than 75% of the total number of meetings of the Board or of any committees of the Board of which he or she was a member during the year ended December 31, 2022.

Director Independence

Our Board has assessed the independence of each director, as defined in the listing standards of Nasdaq Listing Rules and applicable laws. Based on information provided by each director concerning his or her background, employment, and affiliations, our Board has determined that all members of our Board, except Messrs. Mo Chen and Cheng Lu, are independent. In making such independence determination, our Board considered the relationships that each such non-employee director has with us and all other facts and circumstances that the board of directors deemed relevant in determining their independence, including the beneficial ownership of our capital stock by each non-employee director. In considering the independence of the directors listed above, our Board considered the association of our directors with the holders of more than 5% of our capital stock. The composition and functioning of our Board and each of our committees complies with all applicable requirements of and the rules and regulations of the SEC. There are no family relationships among any of our directors or executive officers.

As disclosed in our Current Report on Form 8-K, filed on November 16, 2022 with the SEC, we are a "controlled company" under the Nasdaq Listing Rules due to the fact that Mr. Chen beneficially owns more than 50% of the Company's voting power. As of August 2023, Mr. Chen beneficially owns approximately 58% of the voting power of the outstanding common stock. Under these Nasdaq Listing Rules, a company of which more than 50% of the voting power in the election of directors is held by an individual, group, or another company is a "controlled company" and may elect not to comply with certain corporate governance requirements, including the requirements that (i) a majority of the board of directors consist of independent directors and (ii) the board of directors have compensation and nominating and corporate governance committees composed entirely of independent directors.

These exemptions do not modify the independence requirements for our Audit Committee and we are compliant with Nasdaq Listing Rules, as well as SEC rules, for our Audit Committee and our Nominating and Corporate Governance Committee. Currently, our Compensation Committee is not composed entirely of independent directors, as permitted under the exemption stated above. We maintain the option to fully utilize these exemptions as a "controlled company." In the event that we cease to be a "controlled company" and our shares continue to be listed on Nasdaq, we will be required to comply with these provisions within the applicable transition periods.

Stockholder Communications with the Board of Directors

Stockholders and other interested parties wishing to communicate with our Board or with an individual member of our Board may do so by writing to the Board or to a particular director by mail to our principal executive offices, Attention: Corporate Secretary. The envelope should indicate that it contains a stockholder communication.

Our Corporate Secretary will review each communication and will forward the communication, as expeditiously as reasonably practicable, to the addressees if: (1) the communication complies with the requirements of any applicable policy adopted by the Board relating to the subject matter of the communication; and (2) the communication falls within the scope of matters generally considered by the Board. To the extent the subject matter of a communication relates to matters that have been delegated by the Board to a committee or to an executive officer of the Company, then our Corporate Secretary may forward the communication to the executive officer or chair of the committee to which the matter has been delegated. The acceptance and forwarding of communications to the members of the Board or an executive officer does not imply or create any fiduciary duty of the Board members or executive officer to the person submitting the communications.

Information may be submitted confidentially and anonymously, although the Company may be obligated by law to disclose the information or identity of the person providing the information in connection with government or private legal actions and in other circumstances. The Company's policy is not to take any adverse action, and not to tolerate any retaliation, against any person for asking questions or making good faith reports of possible violations of law, our policies, or our Governance Documents.

Board Committees

Our Board has established an Audit Committee, a Compensation Committee, a Nominating and Corporate Governance Committee, and a Government Security Committee (the "GSC"). Our Board may establish other committees to facilitate the management of our business. Our Board has delegated various responsibilities and authority to its committees as generally described below. The committees will regularly report on their activities and actions to the full Board of directors.

Charters for each regular committee of our Board are posted on our website, under the Governance section (<https://ir.tusimple.com/governance/governance-documents/default.aspx>).

The Audit Committee must have at least three directors; the Compensation Committee, the GSC, and the Nominating and Governance Committee must each have at least two directors. Members serve on these standing committees until their resignation or until otherwise determined by our Board. The following table is a summary of our committee structure and members on each of our standing committees as of August 2023:

Board Member	Audit	Compensation	Nominating and Corporate Governance	Government Security
Mo Chen (Chair) Cheng Lu		X		
James Lu	X	Chair	Chair	
Wendy Hayes	Chair		X	X
Michael Mosier				X
J. Tyler McGaughey				Chair and Security Director
Zhen Tao	X			

Audit Committee

Each member of our Audit Committee is independent under the rules and regulations of the SEC and the listing standards of the Nasdaq applicable to audit committee members. The current members of our Audit Committee are: Ms. Wendy Hayes, serving as the Audit Committee's chair, Mr. James Lu, and Ms. Zhen Tao. Our Board has determined that Ms. Hayes is qualified as an audit committee financial expert within the meaning of SEC regulations and meets the financial sophistication requirements of the Nasdaq Global Select Market. Our Audit Committee met fifteen times in 2022.

The primary responsibilities of our Audit Committee are: (i) assisting our Board with its oversight of the integrity of our financial statements, legal and regulatory compliance, and risk management, as they related to financial statements or accounting matters, and the implementation, adequacy, and effectiveness of our internal audit function; (ii) reviewing and discussing the adequacy and effectiveness of our disclosure controls and procedures; (iii) discussing with our management and independent registered public accounting firm the annual audit plan and scope of audit activities, scope, and timing of the annual audit of our financial statements, and the results of the audit, quarterly reviews of our financial statements, and, as appropriate, initiates inquiries into certain aspects of our financial affairs; (iv) establishing and overseeing procedures for the receipt, retention, and treatment of any complaints regarding accounting, internal accounting controls, or auditing matters, as well as for the confidential and anonymous submissions by our employees of concerns regarding questionable accounting or auditing matters; (v) managing the appointment, compensation, performance, independence, and scope, among others, of the work of our independent registered public accounting firm and for overseeing cybersecurity risks and compliance; (vi) sole authority for approving the hiring and discharging of our independent registered public accounting firm, all audit engagement terms and fees, and all permissible non-audit engagements with the independent auditor; and (vii) reviewing and overseeing all related person transactions in accordance with our policies and procedures.

Compensation Committee

Our Compensation Committee operates under a formal written charter and has the sole authority and responsibility to review and approve the compensation package of our named executive officers. Our Compensation Committee also considers the design and effectiveness of the compensation program for our other executives and approves the final compensation package, employment agreements, and incentive grants for our executives.

During the year ended December 31, 2022, our Compensation Committee engaged the services of Frederic W. Cook & Co., Inc. ("FW Cook"), a national compensation consulting firm, to advise our compensation committee regarding the amount and types of compensation provided to our executive officers and non-employee directors. Our Compensation Committee has assessed the independence of FW Cook pursuant to SEC and Nasdaq Global Stock Market rules and concluded that no conflict of interest exists that would prevent FW Cook from independently representing our compensation committee.

The current members of our Compensation Committee are: Mr. James Lu, serving as the Compensation Committee's chair, and Mr. Mo Chen. Our Compensation Committee met ten times in 2022.

The primary responsibilities of our Compensation Committee are: (i) assisting our Board with matters relating to global compensation philosophy and policies, plans and benefit programs, and making related recommendations to the Board, including by considering "say-on-pay" votes of our stockholders, compensation of our executive officers, and administration and review of our incentive plans for employees and other service providers, including our equity incentive plans; (ii) assisting in the review of the Company's compensation discussion and analysis ("CD&A") required by Item 402(b) of Regulation S-K; and (iii) recommending to the Board whether to include such CD&A in the Company's proxy statement and Annual Report on Form 10-K.

Nominating and Corporate Governance Committee

The members of our Nominating and Corporate Governance Committee are Mr. James Lu, serving as the Nominating and Corporate Governance Committee chair, and Ms. Hayes. The primary responsibilities of our Nominating and Corporate Governance Committee are assisting our Board with its oversight on matters related to: identifying individuals qualified to become members of our Board, consistent with criteria approved by our Board, selecting and recommending director nominees to our Board, developing and recommending to our Board a set of corporate governance guidelines, and overseeing the evaluation of our Board members. Our nominating and corporate governance committee met two times in 2022.

Government Security Committee

The members of our Government Security Committee are: Mr. McGaughey, serving as our Government Security Committee chair and security director, Mrs. Hayes, and Mr. Mosier. The primary responsibility of our Government Security Committee is to assist our Board by providing oversight of our implementation and adherence to the terms of the NSA. Our Government Security Committee met four times in 2022.

ITEM 11. EXECUTIVE COMPENSATION

COMPENSATION DISCUSSION AND ANALYSIS

The purpose of this compensation discussion and analysis (the "CD&A") is to provide information about the material elements of compensation that is paid or awarded to, or earned by, our named executive officers (the "NEOs").

Named Executive Officers

Our NEOs for the last completed fiscal year were as follows:

- Cheng Lu, our Chief Executive Officer (“CEO”);
- Eric Tapia, our Chief Financial Officer (“CFO”);
- Xiaodi Hou, our former CEO and Chief Technology Officer;
- Ersin Yumer, our former interim CEO and President;
- Patrick Dillon, our former CFO; and
- James Mullen, our former Chief Administrative and Legal Officer (“CALO”).

On March 3, 2022, the Company announced the resignation of Cheng Lu as President, CEO and as a member of the Company's Board of Directors, each effective as of March 3, 2022. After that date, Cheng Lu served as a consultant to the Company until November 10, 2022, when the Board re-appointed Cheng Lu as the Company's CEO. On June 15, 2022, Mr. Dillon notified the Company of his decision to resign his employment as the CFO of the Company, effective July 7, 2022. On August 31, 2022, Mr. Mullen notified the Company of his intent to resign from his employment as the Chief Administrative and Legal Officer of the Company, effective September 30, 2022. On October 30, 2022, Mr. Hou was terminated from his employment as the CEO and Chief Technology Officer of the Company by our Board. Following his termination of employment, Mr. Hou remained as a Board member until March 9, 2023. Mr. Yumer served as EVP, Operations until he was appointed as interim CEO and President on October 31, 2022. On November 10, 2022, the Company's Board removed Mr. Yumer as interim CEO and President of the Company. On November 15, 2022, Mr. Yumer notified the Company of his decision to resign his employment with the Company, effective November 25, 2022.

Compensation Philosophy and Objectives

Our compensation and benefits programs are designed to attract and retain talented, qualified executives to manage and lead the Company, to motivate them to pursue corporate objectives, to align the interests of our executives with those of our stockholders and to maximize the long-term growth of the Company. We believe that our compensation program allows us to meet the following objectives:

- *Compensate NEOs comparing to market standards.* We believe that competitive pay, together with our significant growth opportunities and employee-centered corporate culture, allow us to attract and retain top-quality executives. To ensure the competitiveness of our compensation levels within the comparable markets for executive talent, we conduct periodic independent consulting studies to evaluate our executive compensation program in comparison to pertinent market data and specified peer companies.
- *Provide compensation that is fair to the NEOs and the Company.* We believe that it is important for NEOs to be fairly compensated, at levels reflective of their talents and experience, and the scope of their job responsibilities. We also believe that it is important that each NEO perceives that their compensation is fair and equitable relative to their peers and others in the organization. This perceived equity promotes executive retention and satisfaction and is consistent with our beliefs and values.
- *Create a high-performance culture.* We believe that NEOs should strive to achieve and exceed performance expectations and drive the growth and success of the business. We also believe that superior performance warrants superior rewards. Our merit-based salary increases and the CEO's performance-based equity awards are designed to promote this high-performance culture and motivate our executives to achieve at their highest potential.

Determination of Executive Compensation

The targeted compensation range and amount of each element of our compensation program is determined by our Compensation Committee at the time of initial hire, promotion, or employment agreement renewal, taking into consideration our results of operations, long- and short-term goals, the competitive market for the NEOs, and general economic factors. We then review compensation on an annual basis as described below. We seek to combine the components of our executive compensation program to achieve a total compensation level appropriate for our size and corporate performance. We then determine the amount of each element of compensation based on our compensation objectives.

Role of Compensation Committee

The Compensation Committee is responsible for establishing and overseeing our executive compensation programs and we expect that the Compensation Committee will annually review and determine the compensation to be provided to our NEOs, including with respect to our CEO.

Consistent with our compensation philosophy, in setting executive compensation, the Compensation Committee will consider a number of factors, including the recommendations of our CEO (other than with respect to the CEO’s own compensation) and our human resources team, current and past total compensation, competitive market data and analysis provided by the Compensation Committee’s independent compensation consultant, Company performance and each executive’s impact on performance, each executive’s relative scope of responsibility and potential, each executive’s individual performance and demonstrated leadership, and internal equity pay considerations.

Role of Compensation Consultant

The Compensation Committee has the authority to retain a compensation consultant or obtain advice from external legal, accounting, or other advisors to assist in the evaluation of executive compensation. The Compensation Committee retained FW Cook as its outside compensation consultant from 2021 until present. During 2022, FW Cook provided updated peer group comparative data (as discussed below) and assisted the Compensation Committee with setting the Company’s discretionary performance-based cash and equity compensation plans.

The Compensation Committee reviewed the independence of FW Cook as required by SEC rules and Nasdaq rules regarding compensation consultants and has concluded that the work of FW Cook for the Compensation Committee does not raise any conflict of interest. All work performed by the compensation consultant is subject to review and approval of the Compensation Committee.

Role of the Executive Officers

During 2022, Cheng Lu and Mr. Hou, while serving as CEO, participated in the meetings of the Compensation Committee at which compensation actions involving our NEOs (other than Cheng Lu or Mr. Hou) were discussed. Cheng Lu and Mr. Hou assisted the Compensation Committee by making recommendations and answering questions by the Compensation Committee regarding executive performance and objectives relating to the NEOs other than themselves.

The Compensation Committee considers the guidance and recommendations of its advisors and the executive officers, but is solely responsible for making the final decisions on compensation for the NEOs.

2022 Peer Group and Competitive Pay

To ensure that our executive compensation program is competitive, the Compensation Committee has, in prior years, reviewed an analysis of executive compensation at peer group companies assembled by FW Cook. The Compensation Committee uses data from the peer group as a point of reference for compensation, but not as the determinative factor. The purpose of the comparison data is not to supplant the analysis of internal pay equity, wealth accumulation and the individual performance of the executive officers that the Compensation Committee considers when making compensation decisions. The Compensation Committee has full discretion in determining the nature and extent of the use of comparative compensation data, including to elect not to use the data at all.

The peer group used for 2022 pay decisions for Messrs. Dillon and Mullen, our former CFO and former Chief Administrative and Legal Officer, respectively, was developed in October 2021 (“Early 2022 Peers”). The Early 2022 Peers consisted of high technology companies with market capitalization between \$4.1 and \$17.3 billion, which was approximately 0.5x-to-2.1x our market capitalization at the time of the analysis. Our market capitalization was at the 45th percentile at the time the Early 2022 Peers were chosen. The Early 2022 Peers consisted of the following companies:

Alteryx	Coupa Software	Manhattan Associates
Anaplan	Dynatrace	Medallia
Appian	Elastic N.V.	MongoDB
Aspen Technology	Fastly	Nuance Communications
Avalara	Five9	PTC
Bill.com	Lyft	Virgin Galactic

In August 2022, the Compensation Committee, with assistance of FW Cook, conducted its annual review of our peer group and made revisions to recognize TuSimple’s then-current market capitalization (“2022 Peer Group”). The 2022 Peer Group targeted high technology companies with market capitalization between \$700 million and \$6 billion (approximately 1/3x-to-3x our market capitalization at the time of the analysis) and that had annual revenue less than approximately \$500 million. Our market capitalization was at the 53rd percentile at the time the 2022 Peer Group was chosen.

The revised 2022 Peer Group consisted of the following companies:

A10 Networks	E2open Parent	PROS Holding
BTRS	InterDigital	PubMatic
C3.ai	Model N	Sumo Logic
Cardlytics	Momentive Global	Telos
Cerence	PagerDuty	Vertex
Domo	Ping Identity	Zuora

Compensation Structure

Overview

The primary elements of our NEO's compensation and the main objectives of each are:

- *Base Salary.* Base salary attracts and retains talented executives in a competitive market, recognizes individual roles and level of responsibilities, and provides stable income;
- *Annual Bonus.* Annual discretionary bonuses promote and reinforce short-term performance objectives and reward executives for their contributions toward achieving individual and Company objectives;
- *Equity Based Long-Term Incentive Compensation.* Equity compensation, provided in the form of restricted stock units ("RSUs"), aligns executives' interests with our stockholders' interests, emphasizes long-term financial and operational performance, and helps retain executive talent; and
- *Miscellaneous Compensation.* Our NEOs are eligible to participate in our health and welfare programs and our 401(k) match contribution plan. We have also entered into employment agreements with certain of our NEOs, which include severance benefits and maintain a change in control and severance plan. Such arrangements aid in attracting and retaining executive talent and help executives to remain focused and dedicated during potential transition periods due to a change in control.

Base Salary

The annual base salary of each NEO is expected to be reviewed from time to time and may be adjusted by our Compensation Committee based on a variety of quantitative and qualitative factors, including each executive's job responsibilities, experience, performance, and competitive market levels, as well as the recommendations of our CEO (except with respect to his own salary). No NEO is entitled to any automatic base salary increases as part of their employment arrangements. In setting 2022 base salaries, the Compensation Committee took into account the changes in leadership and promotions made throughout the year. Our NEOs' base salary for 2022 and as compared to 2021 is reflected in the table below:

Name	2022 Base Salary (\$)	2021 Base Salary (\$)	Special Considerations
Cheng Lu ⁽¹⁾	450,000	450,000	—
Xiaodi Hou	500,000 ⁽²⁾	350,000	Promoted to CEO
Eric Tapia	360,000 ⁽³⁾	265,000 ⁽⁴⁾	Promoted to CFO
Ersin Yumer	426,000	426,000 ⁽⁵⁾	Served as Interim CEO
Patrick Dillon	450,000 ⁽⁶⁾	350,000	—
James Mullen	450,000 ⁽⁶⁾	350,000	—

1. Cheng Lu's salary remained the same when he was rehired in December 2022.
2. In March 2022, Mr. Hou began serving as the Company's CEO in addition to his role as the Company's Chief Technology Officer.
3. This corresponds to Mr. Tapia's base salary in effect as of 2022 fiscal year end for Mr. Tapia's position as the Company's CFO. Mr. Tapia served in multiple positions in 2022, with different base salaries. From January 1, 2022 to July 6, 2022, Mr. Tapia served as the Vice President, Global Controller of the Company, with an annual base salary in the amount of \$325,000. From July 7, 2022 to November 30, 2022, Mr. Tapia served as the interim CFO of the Company, with an annual base salary in the amount of \$360,000. From December 1, 2022 to December 31, 2022, Mr. Tapia served as the Company's CFO, with the same annual base salary as when he served as the Company's interim CFO.
4. This reflects the base salary for Mr. Tapia's role as Vice President, Global Controller of the Company.
5. This figure represents Mr. Yumer's base salary in effect in 2021, which reflects his role as the Company's Executive Vice President for Operations.
6. This amount represents Mr. Dillon and Mr. Mullen's new salary rates which were effective in April 2022. This salary increase took into consideration the need to stabilize and retain the executive team following the leadership transition.

Annual Incentive Compensation

Each of our NEOs is eligible for an annual incentive bonus. The purpose of this annual bonus is to align our executives' short-term compensation opportunity with the Company's business objectives and performance expectations. The annual bonus opportunity helps further our compensation objective of aligning a portion of executive pay with achievement of the Company's short-term goals, which are designed to help the Company achieve its long-term strategic goals and create long-term value for our stockholders. In the beginning of 2022, our Compensation Committee recommended the Board to approve an executive bonus plan for 2022 that would fund based on the achievement of annual corporate performance goals with actual payouts determined based on an assessment of individual performance at year end. However, due to the changes in the composition of our Board and of our executive officers, in January 2023, the Compensation Committee determined, after careful consideration, including by reviewing materials prepared by the Company's independent compensation consultants, that the terms of the proposed 2022 bonuses for some of the Company's current executive officers were just, equitable, and fair as to the Company and that it was in the best interests of the Company and the stockholders of the Company to approve the 2022 bonuses.

In 2022, the Compensation Committee adjusted target cash bonus opportunities to better align with our peer group:

Name	2022 Target Payout (as a % of Salary)	2021 Target Payout (as a % of Salary)
Cheng Lu	100% ⁽¹⁾	75%
Xiaodi Hou	75%	50%
Eric Tapia	29%	20%
Ersin Yumer	45%	35%
Patrick Dillon	75%	60%
James Mullen	75%	60%

1. As discussed below, Cheng Lu's 2022 bonus was guaranteed under his Letter Agreement dated December 2022.

For actual incentive bonuses paid out in fiscal year 2022, please see the "Bonus" column in the "Summary Compensation Table" below, which were determined in the Compensation Committee's discretion.

In the beginning of 2022, our Compensation Committee recommended that the Board approve an executive bonus plan for 2022 that would fund based on the achievement of annual corporate performance goals with actual payouts determined based on an assessment of individual performance at year end. Under the 2022 bonus plan, a pool would be funded between 0% and 150% of target based on the Compensation Committee's assessment of the following corporate goals: (1) technology goals, including continued scaling of our driver-out scope and more expanded operational design domain, and (2) commercial operational goals, including the expansion of the Company's autonomous freight network. The Compensation Committee would have the discretion to adjust the bonus pool for qualitative factors such as degree of success, timing of achievement, and developments and achievements not contemplated at the time the performance goals were established.

In February 2023, the Compensation Committee at that time determined that, due to the changes in the composition of our Board and Compensation Committee, and of our executive officers, there was insufficient information to score bonuses under the original terms of the 2022 bonus plan. After careful consideration, the Compensation Committee approved discretionary bonuses of \$97,200 for Mr. Tapia to recognize his individual contributions during 2022.

Special Cash Bonus

In April 2022, and in consultation with our Compensation Committee, the Board approved a one-time special cash bonus of \$500,000 for each Messrs. Dillon and Mullen, subject to such executive's continuous employment through April 11, 2023 (the "Special Cash Bonus"). The Board awarded the one-time bonus in recognition of the need to retain and stabilize the senior leadership team following Mr. Cheng's resignation as President and CEO in March 2022.

In June 2022, Mr. Dillon notified the Company of his decision to resign his employment and the Company entered into a letter agreement with Mr. Dillon whereby Mr. Dillon agreed to provide advisory services to the Company following his termination, and, as consideration for such ongoing services, the Company agreed to waive its rights to require the repayment of the Special Cash Bonus. In connection with Mr. Mullen's separation in September 2022, the Company also waived its right to repayment of the Special Cash Bonus in consideration of Mr. Mullen's release of claims against the Company.

Furthermore, Cheng Lu received a guaranteed annual bonus for the fiscal year ending December 31, 2022, which Cheng Lu was eligible for under the letter agreement dated December 14, 2022, by and between the Company and Cheng Lu.

Equity Compensation

We believe equity-based awards for our NEOs are a critical long-term incentive component of our compensation program. The Compensation Committee's objective is to grant equity that is competitive and reflects the performance, contribution, and criticality of each individual. Our Compensation Committee exercises its judgment and discretion, in consultation with our CEO and FW Cook, to determine the size and types of equity awards that it approves, the role and responsibility of the NEO, competitive factors, the vested and unvested value of the equity awards held by the NEO, and the NEO's total compensation. Generally, our equity-based awards vest over four years, subject to the employee's continued employment with us on each vesting date; however, we may grant, and have granted, awards with different vesting schedules from time to time, including awards that vest upon achievement of performance-based milestones.

2022 Time-Vested RSUs. In 2022, we granted our NEOs equity-based awards primarily in the form of time-vested restricted stock units ("RSUs"), which support retention and provide long-term alignment with our stockholders' interests. The Compensation Committee determined RSU grant amounts based on an assessment of each individual's performance and contributions to the Company.

2022 Performance-Based RSUs. On November 10, 2022, the Compensation Committee granted Cheng Lu performance-based RSUs, which are subject to both market and service-based vesting requirements. The market-based vesting component will be satisfied if the Company's average closing price over a 60-day trailing period exceeds certain thresholds at any time on or before November 10, 2026, as follows:

Stock Price Hurdle	% Increase Over Grant Date Stock Price	PSUs Eligible to Vest
\$10.00	+270%	33%
\$15.00	+456%	33%
\$20.00	+641%	33%

The service-based vesting requirements will vest in four equal annual installments beginning on November 10, 2023, subject to Cheng Lu's continuous service with the Company through each vesting date. In 2022, we did not grant any performance-based or market-based equity awards to our other NEOs.

As described below, equity awards granted to our NEOs are subject to accelerated vesting under certain circumstances.

Severance and Change in Control Arrangements

We have entered into offer letters or employment-related agreements with certain of our NEOs, which provide for, among other things, severance benefits and payments to be paid upon certain qualifying terminations of employment, including in connection with a "change in control" of the Company, as summarized below. We believe that these types of arrangements are necessary to attract and retain executive talent and are a customary component of executive compensation. In particular, such arrangements can mitigate a potential disincentive for our NEOs when they are evaluating a potential acquisition of the Company and can encourage retention through the conclusion of the transaction. The payments and benefits under such arrangements are designed to be competitive with market practices. A description of these arrangements, as well as information on the estimated payments and benefits that our NEOs would have been eligible to receive as of December 31, 2022, are set forth in the section titled, "*Potential Payments Upon Termination or Change in Control*" below.

Employee Benefits and Perquisites

Our NEOs are eligible to participate in our health and welfare plans to the same extent as are other full-time employees generally. We also pay life insurance premiums on behalf of our NEOs and we do reimburse our NEOs for their necessary and reasonable business and travel expenses incurred in connection with their services to us. Cheng Lu also received a monthly housing allowance pursuant to his Letter Agreement dated December 14, 2022, as further described below. Other than these items, we generally do not provide our NEOs with perquisites or other personal benefits.

Our NEOs are also eligible to participate in the 401(k) plan we maintain for our employees generally. The 401(k) plan is intended to qualify under Section 401(k) of the Internal Revenue Code. Employees may elect to reduce their current compensation by up to the statutorily prescribed annual limits and to have the amount of such reduction contributed to their 401(k) plans. During 2022, the Company offered matching contributions up to 100% of up to 5% of the base salary of all employees, including our NEOs.

Pension Benefits and Nonqualified Deferred Compensation

Our NEOs did not participate in, or otherwise receive any benefits under, any pension or retirement plan or non-qualified deferred compensation plan sponsored by us during the fiscal years ended December 31, 2020, December 31, 2021, and December 31, 2022.

Other Policies and Considerations

Insider Trading Compliance Policy. Under our Insider Trading Compliance Policy, we prohibit our employees, including our executive officers and Board members, from hedging the risk associated with ownership of shares of our common stock and other securities, as well as from pledging any of our securities as collateral for a loan, with limited exceptions.

Corporate Governance Guidelines. Under our Corporate Governance Guidelines, all non-employee directors and executive officers of the Company are subject to our stock ownership guidelines, which require the Company's Executive Officers to own shares and share equivalents with the value of five times (5x) their annual base salary and Non-Employee Directors to own shares and share equivalents with the value of five times (5x) their cash retainer for Board service. Ownership levels are expected to be achieved within five years of this Corporate Governance Guidelines being applicable.

"Golden Parachute" Payments. Sections 280G and 4999 of the Internal Revenue Code provide that certain executive officers and other service providers who are highly compensated or hold significant equity interests may be subject to an excise tax if they receive payments or benefits in connection with a change in control of the Company that exceeds certain prescribed limits, and that we, or a successor, may forfeit a tax deduction on the amounts subject to this additional tax. While the Compensation Committee may take the potential forfeiture of such tax deduction into account when making compensation decisions, it will award compensation that it determines to be consistent with the goals of our executive compensation program even if such compensation is not deductible by us. We currently do not provide any tax gross-ups to cover excise taxes under Section 4999 in connection with a change in control, other than for Cheng Lu, as described below.

Section 162(m). To maintain flexibility and the ability to pay competitive compensation, we do not require all compensation to be deductible. Section 162(m) of the Internal Revenue Code generally limits to \$1.0 million the amount of remuneration that the Company may deduct in any calendar year for certain executive officers. To maintain the flexibility to provide compensation programs for our NEOs that will best incentivize them to achieve our key business objectives and create sustainable long-term stockholder value, the Compensation Committee reserves the right to pay compensation that may not be deductible to the Company.

Accounting for Share-Based Compensation. We follow Financial Accounting Standard Board Accounting Standards Codification Topic 718 ("ASC Topic 718") for our share-based compensation awards. ASC Topic 718 requires companies to measure the compensation expense for all share-based payment awards made to employees and directors, including stock options and RSUs, based on the grant date "fair value" of these awards. This calculation is performed for accounting purposes and reported in the compensation tables below, even though our NEOs may never realize any value from their awards.

Policy Regarding Recoupment of Certain Compensation. In 2022, the SEC adopted final rules implementing the incentive-based compensation recovery provisions of the Dodd-Frank Act. The Company intends to adopt a new recoupment policy to comply with the new requirements, which must be adopted pursuant to the Nasdaq listing standards by December 1, 2023.

COMPENSATION COMMITTEE REPORT

The Compensation Committee of the Board of Directors has reviewed and discussed the foregoing Compensation Discussion and Analysis with management and based on that review and discussion, the Compensation Committee recommended to the Board of Directors that the Compensation Discussion and Analysis be included in this Annual Report on Form 10-K for the fiscal year ended December 31, 2022.

The Compensation Committee

/s/ James Lu
James Lu, Chair

/s/ Mo Chen
Mo Chen

EXECUTIVE COMPENSATION TABLES

2022 Summary Compensation Table

The following table shows information regarding the compensation of our NEOs for services performed during the years ended December 31, 2020, December 31, 2021, and December 31, 2022.

Name and Principal Position	Year	Salary (\$)	Bonus \$(⁽¹⁾)	Stock Awards \$(⁽²⁾)	Option Awards \$(⁽³⁾)	All Other Compensation (\$)	Total (\$)
Cheng Lu <i>Chief Executive Officer</i> ⁽⁴⁾	2022	197,115 ⁽⁵⁾	400,000 ⁽⁶⁾	9,076,250 ⁽⁷⁾	—	451,382 ⁽⁸⁾	10,124,747
	2021	450,000	305,000	—	65,998,500	15,237	66,768,737
	2020	387,500	60,000	8,241,413	7,785,783	1,076,259 ⁽⁹⁾	17,550,955
Xiaodi Hou <i>Former Chief Technology Officer and Chief Executive Officer</i> ⁽¹⁰⁾	2022	439,038	—	—	—	—	439,038
	2021	325,000	187,000	14,110,000	9,160,467	551,424 ⁽¹¹⁾	24,333,891
	2020	280,000	620	45,000	—	73,968	399,588
Ersin Yumer <i>Former Interim Chief Executive Officer</i> ⁽¹²⁾	2022	415,301	—	616,829	—	365,335 ⁽¹³⁾	1,397,465
Eric Tapia <i>Chief Financial Officer</i> ⁽¹⁴⁾	2022	332,713	97,200	1,310,849	—	57,220 ⁽¹⁵⁾	1,797,982
Patrick Dillon <i>Former Chief Financial Officer</i> ⁽¹⁶⁾	2022	247,821	—	3,477,476	—	512,391 ⁽¹⁷⁾	4,237,688
	2021	350,000	350,000	705,500	458,023	34,046	1,897,569
	2020	9,423	50,000	494,485	1,528,703	—	2,082,611
James Mullen <i>Former Chief Administrative and Legal Officer</i> ⁽¹⁸⁾	2022	347,011	—	3,477,476	—	613,771 ⁽¹⁹⁾	4,438,258
	2021	350,000	179,000	8,818,750	—	16,053	9,363,803
	2020	75,000	55,000	329,657	1,020,045	—	1,479,702

- This amount indicates the discretionary bonus granted to certain NEOs by the Company's Compensation Committee. In our 2022 Proxy Statement, we reported bonus amounts earned in respect of fiscal year 2021 in the "Non-Equity Incentive Plan Compensation" column that were awarded to NEOs in the Compensation Committee's discretion, which are more appropriately reported in the "Bonus" column. The bonus amounts earned in fiscal year 2021 reported in the "Summary Compensation Table" above have been revised to reflect this correction by moving such amounts from the "Non-Equity Incentive Plan Compensation" column to the "Bonus" column. No changes were made to the aggregate bonus amount NEOs earned for fiscal year 2021.
- The amounts in the stock awards column represent the grant date fair value of stock awards in respect of Class A Common Stock granted in accordance with Financial Accounting Standards Board ("FASB") Topic 718. For information regarding the assumptions used in determining the fair value of an award, please refer to Note 10 of the Company's Annual Report on Form 10-K as filed with the SEC on February 24, 2022 and Note 10. Stock-Based Compensation to our financial statements contained herein.
- The amounts in the option awards column represent the grant date fair value of option awards in respect of Class A Common Stock granted in fiscal year 2022 in accordance with FASB Topic 718. For information regarding the assumptions used in determining the fair value of an award, please refer to Note 10. Stock-Based Compensation to our financial statements contained herein.
- In 2022, Cheng Lu served as the Company's CEO from January 1, 2022 to March 3, 2022, and again from and after November 10, 2022.
- This amount consists of the sum of: (i) \$147,115, which Cheng Lu received as salary during the time that he served as the Company's CEO from January 1, 2022 to March 3, 2022, and from November 10, 2022 to December 31, 2022; and (ii) \$50,000 paid as salary earned through March 3, 2022 and all Cheng Lu's accrued but unused vacation time or paid time off under the transition and separation agreement dated March 2, 2022 by and between the Company and Cheng Lu.
- This amount refers to the guaranteed bonus for the fiscal year ending December 31, 2022, which Cheng Lu was eligible for under the letter agreement dated December 14, 2022, by and between the Company and Cheng Lu.
- Cheng Lu's award with both market and service-based vesting requirements is calculated by multiplying the number of shares subject to the award by the estimated fair value using a Monte Carlo valuation method pursuant to FASB ASC Topic 718. In December, 2022, Cheng Lu's outstanding options were canceled and exchanged for a new grant of restricted stock units, 50% of which vest solely on continued service with the Company and 50% which vest based on achieving certain stock price hurdles. Each of the options had an exercise price in excess of the fair market value of the Company's Class A Common Stock as of the date of the cancellation and exchange. The exchanged award was valued in accordance with FASB ASC Topic 718, and there was no incremental fair value that resulted from this option for restricted stock unit exchange. For a description of the exchange, please see "Employment and Change in Control Severance Agreements – Employment and Change in Control Severance Agreement with Cheng Lu" below.
- This amount includes: (i) the payment of health insurance premiums under the Consolidated Omnibus Budget Reconciliation Act ("COBRA") in the amount of \$1,382 paid in accordance to the transition and separation agreement dated March 2, 2022 by and between the Company and Cheng Lu; and (ii) \$450,000, which was paid under the letter agreement dated December 14, 2022 by and between the Company and Cheng Lu, and consists of the consulting fees that would have otherwise become payable to Cheng Lu under the consulting agreement dated March 3, 2022 by and between Cheng Lu and the Company had Cheng Lu provided consulting services thereunder through the term of the consulting agreement.

9. This amount represents: (i) \$15,312 for life insurance premiums paid by us on behalf of Cheng Lu, (ii) \$988,947 of income related to Company's forgiveness in December 2020 of principal and accrued interest with respect to a partial-recourse promissory note issued by Cheng Lu to the Company in connection with his exercise of an option to purchase 2,125,000 shares of Class A Common Stock in March 2020, and (iii) \$72,000 of travel and relocation benefits.
10. In 2022, Mr. Hou served as the Company's Chief Technology Officer from January 1, 2022 to March 3, 2022 and as the Company's CEO and Chief Technology Officer from March 4, 2022, to October 30, 2022. The amounts listed represent the total amount earned for both positions.
11. This amount represents (i) \$16,053 paid for life insurance premiums paid by us on behalf of Mr. Hou; and (ii) \$535,371 paid for legal, trust, and tax - planning related service fees paid by us on behalf of Mr. Hou.
12. In 2022, Mr. Yumer served as the Company's Executive Vice-President, Operations from January 1, 2022 to October 30, 2022, and as the Company's interim CEO from October 31, 2022 to November 10, 2022. The amounts listed represent the total amount earned for both positions.
13. This amount includes: (i) the payment of a relocation bonus in the amount of \$7,153; (ii) the severance payment in the amount of \$340,800 under the letter agreement dated November 15, 2022 by and between the Company and Mr. Yumer; (iii) health insurance premiums under COBRA in the amount of \$1,110 also under the letter agreement dated November 15, 2022, (iv) the Company's matching 401(k) contributions in the amount of \$7,822; and (v) \$8,450 as miscellaneous payments.
14. In 2022, Mr. Tapia served as the Company's Executive Vice-President, Global Controller from January 1, 2022 to July 6, 2022, as the Company's interim CFO from July 7, 2022, to December 14, 2022, and as the Company's CFO from and after December 15, 2022. The amounts listed represent the total amount earned for all positions.
15. This amount includes reimbursement received by Mr. Tapia for relocation purposes in the amount of \$41,969 and the Company's matching 401(k) contributions in the amount of \$15,250.
16. In 2022, Mr. Dillon served as the Company's CFO from January 1, 2022 until July 7, 2022. The amounts listed represent the total amount earned for this term.
17. This amount consists of: (i) the amount of \$500,000 as a retention bonus that Mr. Dillon received under the retention bonus letter between Mr. Dillon and the Company dated April 11, 2022, which the Company waived its rights to repayment of under the letter dated June 15, 2022 from the Company to Mr. Dillon; and (ii) the Company's matching 401(k) contributions in the amount of \$12,391.
18. In 2022, Mr. Mullen served as the Company's Chief Administrative and Legal Officer from January 1, 2022 until September 30, 2022. The amounts listed represent the total amount earned for this term.
19. This amount includes: (i) the amount of \$500,000 as a retention bonus that Mr. Mullen received under the retention bonus letter between Mr. Mullen and the Company dated April 11, 2022, which the Company waived its rights to repayment, (ii) the payment of health insurance premiums under COBRA in the amount of \$3,329, (iii) the amount of \$95,192 paid as severance, all under the letter agreement dated September 2022 between Mr. Mullen and the Company, and (iv) the Company's matching 401(k) contributions in the amount of \$15,250.

Grants of Plan-Based Awards in 2022

The following table sets forth each grant of plan-based awards to our NEOs during 2022:

Name	Grant Date	Estimated Future Payouts Under Non-Equity Incentive Plan Awards			Estimated Future Payouts Under Equity Incentive Plan Awards ⁽¹⁾			All Other Stock Awards: Number of Shares of Stock or Units (#)	Grant Date Fair Value of Stock and Option Awards (\$) ⁽²⁾
		Threshold (\$)	Target (\$)	Maximum (\$)	Threshold (#)	Target (#)	Maximum (#)		
Cheng Lu	12/14/2022	—	—	—	—	—	—	3,425,000 (3)	6,062,250
	12/14/2022	—	—	—	N/A	N/A	3,425,000	—	3,014,000
Xiaodi Hou	N/A	—	—	—	—	—	—	—	—
Ersin Yumer	4/15/2022	—	—	—	—	—	—	500 (4)	5,595
	7/21/2022	—	—	—	—	—	—	88,074 (4)	611,234
Eric Tapia	7/21/2022	—	—	—	—	—	—	121,713 (5)	1,310,849
Patrick Dillon	4/1/2022	—	—	—	—	—	—	291,490 (6)	3,477,476
James Mullen	4/1/2022	—	—	—	—	—	—	291,490 (6)	3,477,476

1. On December 14, 2022, Cheng Lu received a grant of restricted stock units in respect of Class A Common Stock that are subject to both market and service-based vesting requirements. The market-based vesting requirements will be satisfied if the Company's average closing price over a 60-day trailing period exceeds certain thresholds at any time on or before November 10, 2026, as follows: (a) 33% of the units of stock will vest if such average closing price equals or exceeds \$10, (b) 33% of the units of stock will vest if such average closing price equals or exceeds \$15.00, and (c) 33% of the units of stock will vest if such average closing price equals or exceeds \$20.00. The service-based vesting requirements will vest in four equal annual installments beginning on November 10, 2023; provided that Cheng Lu remains in continuous service on each such vesting date. Cheng Lu's performance award is calculated by multiplying the number of shares subject to the award by the estimated fair value using a Monte Carlo valuation method pursuant to FASB ASC Topic 718.
2. The amount in this column represents the grant date fair value of stock awards granted in fiscal year 2022 in accordance with FASB Topic 718. For information regarding the assumptions used in determining the fair value of an award, please refer to Note 10. Stock-Based Compensation to our financial

statements contained herein. Please see footnote 7 to the “2022 Summary Compensation Table” regarding Cheng Lu’s option for restricted stock unit exchange in December 2022.

3. Reflects service-based restricted stock units in respect of Class A Common Stock granted to Cheng Lu that vest in four equal annual installments, provided that the Cheng Lu remains in continuous service with the Company on each such vesting date.
4. Reflects service-based restricted stock units in respect of Class A Common Stock that are fully vested on the grant date.
5. Reflects service-based restricted stock units in respect of Class A Common Stock that are 25% cliff-vested after year one, and vested 12.5% semi-annually thereafter, provided the NEO remains in continuous service with the Company on each such vesting date.
6. Reflects service-based restricted stock units in respect of Class A Common Stock that are vested 12.5% semi-annually, provided the NEO remains in continuous service with the Company on each such vesting date.

Outstanding Equity Awards at 2022 Fiscal Year End

The following table provides information regarding outstanding equity awards held by our NEOs as of December 31, 2022:

Name	Date of Grant	Option Awards					Stock Awards			
		Number of Securities Underlying Unexercised Options (#)	Number of Securities Underlying Unexercised Options (#)	Number of Securities Underlying Unexercised Options (#)	Option Exercise Price (\$)	Option Expiration Date	Number of Shares or Units of Stock That Have Not Vested (#)	Market Value of Shares or Units of Stock That Have Not Vested (\$) ⁽¹⁾	Unearned Shares, Units or Other Rights That Have Not Vested (#)	Payout Value of Unearned Shares or Units of Stock That Have Not Vested (\$) ⁽¹⁾
Cheng Lu	12/14/20	—	—	—	—	—	3,425,000 ⁽²⁾	5,617,000	—	—
	12/14/20	—	—	—	—	—	—	—	3,425,000 ⁽³⁾	—
Xiaodi Hou	6/29/202	—	—	—	—	—	125,000 ⁽⁴⁾	205,000	—	—
	7/20/202	100,000 ⁽⁵⁾	300,000 ⁽⁵⁾	—	47.79	6/9/2023 ⁽⁶⁾	—	—	—	—
Ersin Yumer	N/A	—	—	—	—	—	—	—	—	—
Eric Tapia	7/21/202	—	—	—	—	—	121,713 ⁽⁷⁾	199,609	—	—
	6/29/202	—	—	—	—	—	24,750 ⁽⁸⁾	40,590	—	—
Patrick Dillon	12/24/20	109,375 ⁽⁹⁾	—	—	4.20	10/17/20	—	—	—	—
	12/24/20	21,875 ⁽⁹⁾	—	—	8.11	10/17/20	—	—	—	—
	12/24/20	21,875 ⁽⁹⁾	—	—	14.00	10/17/20	—	—	—	—
	7/20/202	5,000 ⁽¹⁰⁾	—	—	47.79	10/17/20	—	—	—	—
James Mullen	12/24/20	112,500 ⁽¹¹⁾	—	—	4.20	9/30/202	—	—	—	—
	12/24/20	37,500 ⁽¹¹⁾	—	—	8.11	9/30/202	—	—	—	—
	12/24/20	37,500 ⁽¹¹⁾	—	—	14.00	9/30/202	—	—	—	—

1. Determined with reference to \$1.64, the closing price of a share of our Class A Common Stock on the last trading day before December 31, 2022. Each equity award is in respect of Class A Common Stock.
2. These RSUs are subject to a service-based vesting requirement, which will vest in four equal annual installments beginning on November 10, 2023, provided that Cheng Lu remains in continuous service on each such vesting date.
3. These RSUs are subject to both market and service-based vesting requirements. The market-based vesting requirements will be satisfied if the Company’s average closing price over a 60-day trailing period exceeds certain thresholds at any time on or before November 10, 2026, as follows: (a) 33% of the units of stock will vest if such average closing price equals or exceeds \$10, (b) 33% of the units of stock will vest if such average closing price equals or exceeds \$15.00, and (c) 33% of the units of stock will vest if such average closing price equals or exceeds \$20.00. The service-based vesting requirements will vest in four equal annual installments beginning on November 10, 2023, provided that Cheng Lu remains in continuous service on each such vesting date.
4. These RSUs are subject to a service-based vesting requirement, which vest as follows: (a) 25% of the RSUs vested on June 1, 2022, and (b) 12.5% of the RSUs vested every six months thereafter, provided that Mr. Hou remains in continuous service on each such vesting date. As of December 31, 2022, Mr. Hou had 125,000 outstanding RSUs, which were cancelled immediately upon Mr. Hou’s resignation from the Company’s Board on March 9, 2023.
5. These options are subject to a service-based vesting requirement, which vest as follows: (a) 25% of the options vested on July 20, 2022, and (b) 12.5% of the options vest every six months thereafter; provided that Mr. Hou remains in continuous service on each such vesting date. As of December 31, 2022, Mr. Hou had 400,000 outstanding options, 250,000 of which were unvested and cancelled immediately as of his resignation from the Company’s Board on March 9, 2023, and 150,000 of which were vested as of his resignation date were unexercised and expired on June 9, 2023.

6. Mr. Hou's options were initially set to expire on July 19, 2031. However, due to Mr. Hou's resignation from the Board on March 9, 2023, Mr. Hou had three months after his termination to exercise any vested options and such options were unexercised and expired on June 9, 2023.
7. These RSUs are subject to a service-based vesting requirement, which will be satisfied over a four-year period, having 25% vesting on July 7, 2023, and 12.5% of those RSUs vesting each six months thereafter, subject to Mr. Tapia's continuous service with the Company.
8. These RSUs are subject to a service-based vesting requirement, which will be satisfied over a four-year period, with 25% of the RSUs vesting on each anniversary of May 1, 2021, subject to Mr. Tapia's continuous service with the Company on each such date.
9. These options are subject to a service-based vesting requirement, which will be satisfied over a four-year period, having 25% vesting on December 15, 2021, and 6.25% of those options vesting each three months thereafter, subject to Mr. Dillon's continuous service with the Company. As of October 17, 2022, which was the end of the transition period associated with Mr. Dillon's separation from the Company, all of the outstanding unvested options were cancelled immediately and the expiration date of the outstanding vested options was extended to October 17, 2024.
10. These options are subject to a service-based vesting requirement, which will be satisfied over a four-year period, having 25% vesting on July 20, 2022, and 12.5% of those options vesting each six months thereafter, subject to Mr. Dillon's continuous service with the Company. As of October 17, 2022, which was the end of the transition period associated with Mr. Dillon's separation from the Company, all of the outstanding unvested options were cancelled immediately and the expiration date of the outstanding vested options was extended to October 17, 2024.
11. These options are subject to a service-based vesting requirement, which will be satisfied over a four-year period, with 25% vesting on December 15, 2021, and 6.25% of those options vesting every three months thereafter, subject to Mr. Mullen's continuous service with the Company. Upon Mr. Mullen's separation from the Company on September 30, 2022, the Company accelerated the vesting for periods between October 1, 2022 and September 30, 2023, and extended the expiration date of the vested options to September 30, 2024.

Option Exercises and Stock Vested During Fiscal Year 2022

Name	Option Awards		Stock Awards	
	Number of Shares Acquired on Exercise (#)	Value Realized on Exercise (\$)	Number of Shares Acquired on Vesting (#)	Value Realized on Vesting (\$)
Cheng Lu	—	—	175,000	2,318,750
Xiaodi Hou	—	—	75,000	455,500
Ersin Yumer	—	—	58,552 (1)	335,668
Eric Tapia	—	—	8,250	85,553
Patrick Dillon	—	—	50,186 (2)	389,401
James Mullen	—	—	168,497 (3)	1,571,658

1. This number includes 17,025 shares vested but not distributed as of December 31, 2022 due to Rule 144 restrictions.
2. This number includes 40,186 shares that were accelerated on October 17, 2022, pursuant to the separation agreement dated June 15, 2022 between the Company and Mr. Dillon.
3. This number includes 114,122 shares that were accelerated on September 30, 2022, pursuant to the separation agreement dated September 22, 2022 between the Company and Mr. Mullen.

Pension; Nonqualified Deferred Compensation

The Company does not maintain a non-qualified deferred compensation plan for the benefit of the NEOs and none of the NEOs participate in a defined benefit pension plan maintained by the Company.

Employment and Change in Control Severance Agreements

Employment and Change in Control Severance Agreement with Cheng Lu

Cheng Lu served as the Company's CEO in early 2022, departed from the Company for a short period, and re-joined the Company again as CEO at the end of 2022. On December 14, 2022, the Company and Cheng Lu entered into a letter agreement (the "Letter Agreement") and a severance and change in control agreement (the "Severance and CIC Agreement"). The Letter Agreement provides that Cheng Lu will receive an annual base salary of \$450,000, a target annual bonus opportunity of 80% of his annual base salary, which is guaranteed to be at least equal to \$400,000 for the fiscal year ending December 31, 2022, and a monthly housing allowance of \$9,000. The Letter Agreement further provides for an award of 6,850,000 restricted stock units, 50% of which will be restricted stock units granted subject solely to service-based vesting requirements and will vest over four years, with 25% of them vesting on each of the first four anniversaries of November 10, 2022 (the "Service-Based Requirement") and 50% of which will be granted in the form of restricted stock units subject to both service-based and market-based vesting requirements that will be eligible to vest based upon the attainment of both the Service-Based Requirement and certain stock price hurdles, as described above under "Equity Compensation," in either case, subject to continued employment. The award of RSUs was made in exchange for the cancellation and forfeiture of each of Cheng Lu's 1,850,000 outstanding

time-vested stock options, and took into account the 1,150,000 performance-based options that were forfeited when Cheng Lu resigned as CEO in March 2022. The Letter Agreement also provides for a cash payment of \$150,000, which represents the balance of the consulting fees that Cheng Lu would have received under his consulting agreement, had that agreement continued in accordance with its terms.

The Severance and CIC Agreement provides for the following severance entitlements upon a termination of employment by the Company without cause or by Cheng Lu for good reason, in either case, other than within six months prior to or within twelve months following a change in control: (i) twelve months of base salary continuation; (ii) subsidized COBRA coverage for up to eighteen months; (iii) a lump-sum cash amount equal to \$15,000,000 payable within thirty days of such termination of employment by the Company without cause or by Cheng Lu for good reason; provided, that such termination occurs prior to the third anniversary of the effective date of the Letter Agreement; and (iv) an additional eighteen months vesting of then-outstanding equity awards, with performance goals and other vesting criteria to be deemed satisfied in accordance with the terms of the applicable award agreement and the stock price hurdles applicable to his initial market-based restricted stock units deemed achieved. The Severance and CIC Agreement further provides for the following severance entitlements upon a termination of employment by the Company without cause or by Cheng Lu for good reason, in either case, within six months prior to or within twelve months following a change in control: (i) a lump-sum cash payment equal to two times the sum of his base salary and annual target bonus; (ii) subsidized COBRA coverage for up to eighteen months; and (iii) accelerated vesting of each then-outstanding equity award, with performance goals or other vesting criteria deemed satisfied. The foregoing benefits and entitlements are subject to Cheng Lu's execution and nonrevocation of a release of claims in favor of the Company. The Severance and CIC Agreement further provides that, upon the occurrence of a change in control, Cheng Lu will receive: (i) a lump-sum cash payment equal to the greater of \$15,000,000 or 0.60% of the total equity value of the Company calculated based on the aggregate consideration received in connection with such change in control; and (ii) accelerated vesting of each then-outstanding equity award, with performance goals or other vesting criteria deemed satisfied. The Severance and CIC Agreement also provides Cheng Lu with an indemnity for any excise tax imposed pursuant to Section 4999 of the Internal Revenue Code.

Severance and Change in Control Agreements with Messrs. Hou, Dillon and Mullen

On March 22, 2021, we entered into Change in Control and Severance Agreements (the "CIC and Severance Agreements") with each of Messrs. Hou, Dillon, and Mullen. The CIC and Severance Agreements for Mr. Dillon and Mr. Mullen were subsequently amended in April 2022. The CIC and Severance Agreements provide that if an executive is subject to a termination without cause or resigns for good reason, such individual will be eligible to receive, for the 12-month period following such involuntary termination (except as noted below) continued payment of base salary, continued payment of the employer's portion of insurance premiums under COBRA, and vesting acceleration of all outstanding equity awards as if the individual had provided continuous service for a period of six months following termination (and the opportunity to vest into certain performance awards during the specified period following such involuntary termination).

Pursuant to the CIC and Severance Agreements, if an involuntary termination occurs during the period beginning three months prior to, and ending on the date that is twelve months after a change in control of the Company, each of our NEOs is eligible to receive, for the eighteen month period following such involuntary termination, continued payment of base salary, continued payment of the employer's portion of insurance premiums under COBRA, and a prorated bonus (at 100% of target). Further, all of the executive's then-unvested time-based equity awards will become vested (unless our Board provides otherwise at the time an award is granted). In the case of equity awards with performance-based vesting, all performance goals and other vesting criteria will be determined in accordance with the terms set forth in the award agreement evidencing the applicable equity award.

Mr. Dillon and Mr. Mullen's CIC and Severance Agreements provide that, in the event of an involuntary termination outside of a Change in Control Period (as defined in the CIC and Severance Agreements), the total number of vested shares subject to each of such executive's then-outstanding equity awards subject to time-based vesting will be determined by adding twelve months to executive's actual period of employment as of the separation date. In the case of equity awards with performance-based vesting, all performance goals and other vesting criteria will be deemed satisfied in accordance with the terms set forth in the award agreement evidencing the applicable equity award.

All such payments and benefits are contingent on the NEO's execution and non-revocation of a general release of claims against the Company.

Additionally, Mr. Tapia is entitled to participate in the 2023 Severance and CIC Plan, as discussed in the section titled "Potential Payments upon Termination or Change in Control - 2023 Senior Management Severance and Change in Control Plan" below.

Potential Payments upon Termination or Change in Control

The following table quantifies the eligible payments that each NEO would have been entitled to receive upon various termination of employment scenarios, assuming the termination occurred on December 31, 2022 (other than those NEOs that actually separated from the Company prior to the end of the fiscal year and became entitled to severance under the terms of their applicable severance agreements as described under “*Named Executive Officer Departures*” below) or upon the occurrence of a change in control and without a termination of employment in connection with the change in control.

Named Executive Officer	Termination Scenario	Cash Severance (\$)	Value of Accelerated Stock Awards (\$)	COBRA (\$) ⁽¹⁾	Total (\$)
Cheng Lu ⁽³⁾	Termination without Cause or resignation for	15,450,000 ⁽³⁾	2,808,500 ⁽⁴⁾	25,770	18,284,270
	Termination without Cause or resignation for	16,700,000 ⁽⁵⁾	11,234,000 ⁽⁶⁾	25,770	27,959,770
Eric Tapia ⁽⁷⁾	Termination without Cause or resignation for	—	—	—	—
	Termination without Cause or resignation for	—	—	—	—

1. Represents continued coverage under COBRA for a period of eighteen months. Please see “*Employment and Change in Control Severance Agreements - Employment and Change in Control Severance Agreement with Cheng Lu*” for additional details regarding Cheng Lu’s potential payments upon termination or change in control.
2. Includes the value of restricted stock units awards held by Cheng Lu that would become vested under the applicable circumstances. The value of restricted stock units shown is determined by multiplying \$1.64, the closing price of a share of Company common stock on the last trading day before December 31, 2022 and the number of shares of restricted stock units that would become vested under the applicable termination event.
3. This amount represents, under the severance and change in control agreement dated December 14, 2022 by and between the Company and Cheng Lu, the sum of (i) base salary for a period of twelve months; and (ii) a lump-sum cash amount equal to \$15,000,000 (which assumes that \$15,000,000 is greater than 0.60% of the total equity value of the Company in connection with the change in control. Cheng Lu would have received the \$15,000,000 upon the occurrence of the change in control and irrespective of whether or not he would have incurred a qualifying termination as of the date of the change in control.
4. Represents (i) accelerated vesting of time-based awards for an additional eighteen months and (ii) deemed achievement of the applicable stock price hurdles related to Cheng Lu’s market-based RSU award, including accelerated vesting of the time-based portion of such award for an additional eighteen months.
5. Represents the amount equal to the sum of two times Cheng Lu’s base salary plus annual target bonus opportunity and a lump-sum cash amount equal to \$15,000,000.
6. Represents the accelerated vesting of all outstanding equity awards upon the occurrence of a change in control with market-based conditions deemed satisfied.
7. Mr. Tapia was not eligible for any severance or acceleration benefits as a result of any termination of his employment with the Company as of December 31, 2022. Mr. Tapia is eligible to participate in the Senior Management Severance and Change in Control Plan, as of May 30, 2023, as further described and quantified below.

Named Executive Officer Departures

Separation Agreement with Cheng Lu. As described above, in 2022, Cheng Lu served as the Company’s CEO from January 1, 2022 to March 3, 2022 and again from November 10, 2022, to present. In connection with his brief departure from the Company on March 3, 2022, the Company and Cheng Lu entered into a separation agreement, providing for the following: (i) a lump sum of \$50,000, (ii) monthly employer portion of the COBRA premium until the earlier of the end of the eighteen month period following March 3, 2022, the expiration of his coverage under COBRA or the date when he becomes eligible for substantially equivalent health insurance in connection with new employment, (iii) continued vesting of outstanding options for the twelve-month period following March 3, 2022, subject to his continuous service with the Company, and if he remains in continuous service through such date then all shares subject to time-based options accelerate, vest and become exercisable, (iv) his “milestone option” of 1,150,000 options to purchase shares of common stock was forfeited, (v) acceleration of all unvested restricted stock units, and (vi) reimbursement of legal fees incurred in connection with the separation agreement up to \$10,000. The forgoing separation payments were subject to Cheng Lu’s execution for a general release of claims in favor of the Company.

Additionally, in connection with his departure, Cheng Lu and the Company entered into a consulting agreement dated March 3, 2022, whereby Cheng Lu would provide ongoing advisory services to the CEO for the one-year period following March 3, 2022. Pursuant to the consulting agreement, Cheng Lu was entitled to an annualized payment of \$450,000 during the one-year term.

For a description of the current terms of Cheng Lu’s employment with the Company, please see “*Employment Agreements – Employment Agreement With Cheng Lu*” above.

Termination of Xiaodi Hou. Mr. Hou’s employment with the Company was terminated effective as of October 30, 2022. Mr. Hou did not receive any severance or termination related payments in connection with his separation.

Separation Agreement with Ersin Yumer. Effective November 25, 2022, the Company's Board removed Mr. Yumer as interim CEO and President of the Company. In connection with Mr. Yumer's removal, the Company entered into a separation agreement on November 15, 2022, providing for the following: (i) a lump sum payment of \$340,800, which represents 80% of Mr. Yumer's annual base salary, (ii) subsidized COBRA coverage for up to eighteen months and (iii) an additional six months vesting of outstanding equity awards with performance goals and other vesting criteria deemed satisfied in accordance with the terms of the applicable award agreement. The forgoing separation payments were subject to Mr. Yumer's execution of a general release of claims in favor of the Company.

Separation Agreement with Patrick Dillon. Effective July 7, 2022, Mr. Dillon resigned from his position as CFO of the Company. In connection with his separation, the Company and Mr. Dillon entered into a separation agreement dated June 15, 2022, providing for the following: (i) transition advisory services until October 17, 2022, (ii) continued vesting of restricted stock units and options through the transition period, (iii) extension of the exercisability period of options until the earlier of the two-year anniversary of the last date of the transition period and the date on which any Company outstanding options are terminated in connection with certain corporate transactions, (iv) the Company waived its rights to require the repayment of a retention bonus in the amount of \$500,000 previously granted to Mr. Dillon pursuant to a retention bonus letter dated April 11, 2022, and (v) reimbursement for up to \$10,000 of legal fees incurred in connection with his separation agreement. The forgoing separation payments were subject to Mr. Dillon's execution of a general release of claims in favor of the Company.

Separation Agreement with James Mullen. Effective September 30, 2022, Mr. Mullen resigned from his position as Chief Legal and Administrative Officer of the Company. In connection with his separation, the Company and Mr. Mullen entered into a separation agreement dated August 31, 2022, providing for the following: (i) continuation of base salary for twelve months and up to twelve months of subsidized COBRA coverage, (ii) continued vesting of restricted stock units and options for twelve months, (iii) extension of the exercisability period of options until the earlier of September 30, 2024 and the date on which any Company outstanding options are terminated in connection with certain corporate transactions, and (iv) the Company waived its rights to require the repayment of a retention bonus in the amount of \$500,000 previously granted to Mr. Mullen pursuant to a retention bonus letter dated April 11, 2022. The forgoing separation payments were subject to Mr. Mullen's execution of a general release of claims in favor of the Company.

2023 Senior Management Severance and Change in Control Plan

On May 30, 2023, the Compensation Committee adopted the TuSimple Holdings Inc. Senior Management Severance and Change in Control Plan (the "2023 Severance and CIC Plan"). Mr. Tapia is a participant in the 2023 Severance and CIC Plan.

The 2023 Severance and CIC Plan provides that where a participant's employment is terminated outside of the context of a "change in control," either by the Company without "cause" or by the participant for "good reason" (each as defined in the 2023 Severance and CIC Plan), the participant will be entitled to receive: (i) a lump-sum cash payment equal to one-half of the sum of the participant's base salary and target annual bonus; (ii) accelerated vesting of equity awards that would have vested within one year of termination; and (iii) a lump-sum cash payment equal to twelve times the cost incurred by the Company in the month immediately prior to the termination of employment for providing group health, dental, and vision benefits to the participant and the participant's eligible dependents.

In the event that a participant's employment is terminated within six months prior to, or within twelve months following, a change in control, either by the Company without cause or by the participant for good reason, the participant will be entitled to receive: (i) a lump-sum cash payment equal to the sum of the participant's base salary and target annual bonus; (ii) accelerated vesting of each then-outstanding equity award, with the deemed attainment of the applicable performance metrics; and (iii) a lump-sum cash payment equal to twelve times the cost incurred by the Company in the month immediately prior to the termination of employment for providing group health, dental, and vision benefits to the participant and the participant's eligible dependents.

The provision of payments and benefits described above is conditioned upon the participant's execution of a release of claims. The 2023 Severance and CIC Plan provides that if a participant receives any amount, whether under the plan or otherwise, that is subject to the excise tax imposed pursuant to Section 4999 of the Internal Revenue Code, the amount of the payments to be made to the participant will be reduced to the extent necessary to avoid imposition of the excise tax, but only if the net amount of the reduced payments exceeds the net amount that the participant would receive following imposition of the excise tax and all income and related taxes.

Assuming the 2023 Severance and CIC Plan were in effect as of December 31, 2022, Mr. Tapia would have received the amounts as follows: If his termination was without Cause or resignation for Good Reason outside of a Change in Control period, Mr. Tapia would have received a total of \$317,180, which includes \$300,000 as cash severance (representing .5x the sum of his base salary and target annual bonus) and \$17,180 as COBRA coverage (representing continued payment for 12 months). In addition, Mr. Tapia would receive each-then outstanding equity award that would have vested based on continued employment through the first anniversary, which, assuming the 2023 Severance and CIC Plan were in effect as of December 31, 2022, would represent \$63,400 as value of accelerated stock awards.

If his termination was without Cause or resignation for Good Reason within a Change in Control period, Mr. Tapia would have received a total of \$617,180, which includes \$600,000 as cash severance (representing 1x the sum of his base salary and target annual bonus) and \$17,180 as COBRA coverage (which represents payment for 12 months). In addition, Mr. Tapia would receive each then-outstanding and unvested equity award that would vest and become exercisable, which, assuming the 2023 Severance and CIC Plan were in effect as of December 31, 2022, would represent \$240,200 as value of accelerated stock awards.

Director Compensation

The following table sets forth information about the compensation of each person who served as a director during the 2022 fiscal year, other than a director who also served as a NEO.

Name	Fees Earned or Paid in Cash (\$)	Stock Awards (\$) ⁽¹⁾⁽²⁾	Option Awards (\$)	Non-Equity Incentive Plan Compensation (\$)	All Other Compensation (\$)	Total (\$)
Mo Chen ⁽³⁾	—	—	—	—	—	—
Wendy Hayes ⁽⁴⁾	4,409	250,000 ⁽⁵⁾	—	—	—	254,409
Michael Mosier ⁽⁶⁾	14,946	—	—	—	—	14,946
James Lu ⁽⁷⁾	5,685	250,000 ⁽⁸⁾	—	—	—	255,685
Brad Buss ⁽⁹⁾	82,147	188,307	—	—	—	270,454
Charles Chao ⁽¹⁰⁾	—	—	—	—	—	—
Karen C. Francis ⁽¹¹⁾	64,402	188,307	—	—	—	252,709
Michelle Sterling ⁽¹²⁾	73,554	188,307	—	—	—	261,861
Reed Werner ⁽¹³⁾	193,294	—	—	—	—	193,294
Bonnie Yi Zhang ⁽¹⁴⁾	18,750	—	—	—	—	18,750

- The amount in this column represents the grant date fair value of stock awards granted in fiscal year 2022 in accordance with FASB Topic 718. For information regarding the assumptions used in determining the fair value of an award, please refer to Note Note 10. Stock-Based Compensation to our financial statements contained herein. Subject to the director's continuing service, the service-based requirement for the restricted stock units will be satisfied in full over a one-year period. Upon a transaction constituting a "Change in Control" as defined in the 2021 Plan, the service-based requirement applicable to outstanding equity awards granted pursuant hereto will be deemed satisfied in full upon the effective date of such transaction.
- As of December 31, 2022, certain of our non-employee directors held outstanding RSUs under which the following number of shares of our Class A Common Stock are issuable as follows: (i) Ms. Hayes held 156,250 outstanding RSUs; and (ii) Mr. James Lu held 156,250 outstanding RSUs.
- Mr. Chen served as the Board's chair from January 1, 2022 to March 3, 2022 and from November 10, 2022 to December 31, 2022; and as a Board member from March 4, 2022 to November 9, 2022.
- Ms. Hayes has served as a Board member since December 15, 2022.
- The RSUs are subject to a service-based vesting requirement, which shall be satisfied on the earlier of (i) December 15, 2023 or (ii) on the date of the issuer's next annual meeting of stockholders, subject to Ms. Hayes' continuous service with the issuer on such vesting date.
- Mr. Mosier has served as a Board member since December 15, 2022 and, in 2022, served as the Company's security director under the Company's National Security Agreement (the "NSA") with the Committee on Foreign Investments in the United States ("CFIUS"). Due to CFIUS' request, our security directors are compensated in cash, not in stock.
- Mr. James Lu has served as a Board member since December 13, 2022.
- The RSUs are subject to a service-based vesting requirement, which shall be satisfied on the earlier of (i) December 15, 2023 or (ii) on the date of the issuer's next annual meeting of stockholders, subject to James Lu's continuous service with the issuer on such vesting date.
- In 2022, Mr. Buss served as a Board member from January 1, 2022 until November 10, 2022.
- In 2022, Mr. Chao served as a Board member from January 1, 2022 until June 9, 2022.
- In 2022, Ms. Francis served as a Board member from January 1, 2022 until November 10, 2022.
- In 2022, Ms. Sterling served as a Board member from January 1, 2022 until November 10, 2022.
- In 2022, Mr. Werner served as a Board member from April 23, 2022 until November 10, 2022 and, during this time, Mr. Werner served as the Company's security director under the NSA. Due to CFIUS' request, our security directors are compensated in cash, not in stock.
- In 2022, Ms. Zhang served as a Board member from January 1, 2022 until June 9, 2022.

Cash Compensation

The Non-Employee Director Compensation Policy provides for annual cash retainers for all non-employee directors in connection with their service on our Board and committees. Each non-employee director is paid an annual cash retainer for \$50,000 per year for general service on our Board as well as the following additional annual cash retainers for their board committee service:

Committee	Chair	Member
Audit Committee	\$25,000	\$15,000
Compensation Committee	\$20,000	\$10,000
Nominating and Corporate Governance Committee	\$10,000	\$5,000
Government Security Committee	\$32,500	\$22,500

In lieu of the Equity Award described below and in accordance with the NSA and the Non-Employee Director Compensation Policy, the directors who served as the Security Director under the NSA and the chair of the government security committee will receive a cash payment equal to \$250,000, pro-rated to reflect the number of days that the Security Director will serve on our Board until our next annual stockholder meeting.

Annual cash retainers are paid quarterly in arrears. We reimburse reasonable expenses incurred by our non-employee directors in connection with attendance at Board or Committee meetings.

Equity Compensation

The Compensation Committee will approve a grant to each non-employee director an annual award of restricted stock units valued at \$250,000 (the "Equity Award"). The Equity Award will be granted on or as soon as reasonably practicable after the date of the non-employee director's appointment or election, and thereafter on or as soon as reasonably practicable after the date of each of our annual stockholder meetings provided that such director continues to serve on our Board after such meeting. Subject to the non-employee director's continuous service, the Equity Award will vest in full over a one-year period and will vest on the earlier of the first day of the month that follows the one-year anniversary of such date of grant or on the date of the next regular annual meeting of the Company's stockholders held following such date of grant; *provided* that the non-employee director remains in continuous service through such vesting date. In addition, an Equity Award granted between annual stockholder meetings to a newly-appointed director will be pro-rated to reflect the portion of the year that the director will serve on our Board. The Equity Award will vest in full if we are subject to a change in control prior to the termination of the non-employee directors' continuous service.

Our non-employee directors, except our security director, are subject to minimum stock ownership guidelines set at five times the regular annual cash retainer. Ownership levels are expected to be achieved within five years of our guidelines being applicable. CFIUS has determined that our security director cannot be compensated in equity of the Company. For this reason, our security director is not subject to our minimum stock ownership guidelines.

ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS

Securities Authorized for Issuance Under Equity Compensation Plans

The following table provides certain information as of December 31, 2022 with respect to our existing equity compensation plans.

Plan Category	Number of Securities to be Issued Upon Exercise of Outstanding Options, Warrants and Rights (#)	Weighted Average Exercise Price of Outstanding Options, Warrants and Rights ⁽²⁾ (\$)	Number of Securities Remaining Available for Future Issuance Under Equity Compensation Plans ⁽³⁾ (#)
Equity compensation plans approved by stockholders ⁽¹⁾	20,602,012	15.16	18,041,005
Equity compensation plans not approved by stockholders	—	—	—
Total	20,602,012	15.16	18,041,005

- All of our equity compensation plans have been approved by stockholders. This information is with respect to the 2017 Share Plan, the 2021 Equity Incentive Plan, and the 2021 Employee Stock Purchase Plan. The 2021 Equity Incentive Plan is the successor to and continuation of the 2017 Share Plan. As of the effective date of our initial public offering, no additional awards were to be granted under the 2017 Share Plan, but all stock awards granted under the 2017 Share Plan remain subject to their existing terms.
- The weighted average exercise price does not take into account outstanding RSUs or share value awards, neither of which have exercise prices.
- Included in this amount are 16,277,422 shares available for future issuance under our 2021 Equity Incentive Plan and 1,763,583 shares available for future issuance under our 2021 Employee Stock Purchase Plan. No shares are available for issuance under our 2017 Share Plan.

Securities Ownership of Certain Beneficial Owners and Management

The table below sets forth certain information with respect to the beneficial ownership of our Class A Common Stock as of August 8, 2023, for:

- each of our named executive officers;
- each of our directors;
- all of our executive officers and directors as a group; and
- each stockholder known by us to be the beneficial owner of more than 5% of our outstanding Class A Common Stock.

Beneficial ownership is determined according to the rules of the SEC, which generally provide that a person has beneficial ownership of a security if he, she, or it possesses sole or shared voting or investment power over that security, including options and warrants that are currently exercisable or exercisable within 60 days and shares of Class A Common Stock underlying restricted stock units that may be settled within 60 days of August 8, 2023.

The percentage ownership columns in the table is based on 205,095,521 shares of our Class A Common Stock outstanding and 24,000,000 shares of our Class B Common Stock outstanding as of August 8, 2023. The holders of our Class A Common Stock have the right to one vote for each share of Class A Common Stock, and the holders of our Class B Common Stock have the right to ten votes for each share of Class B Common Stock.

We have determined beneficial ownership in accordance with the rules and regulations of the SEC. Except as indicated in the footnotes below, we believe, based on the information furnished to us, that the persons and entities named in the table below have sole voting and investment power with respect to all Class A Common Stock or Class B Common Stock that they beneficially own, subject to applicable community property laws.

Unless otherwise indicated, the business address of each beneficial owner listed in the table below is 9191 Towne Centre Drive, Suite 600, San Diego, CA 92122.

Name of Beneficial Owner		Number of Shares of Class A Common Stock	%	Number of Shares of Class B Common Stock	%	% of Total Voting Power
Named Executive Officers and Directors:						
Cheng Lu, CEO	(1)	2,619,578	1.3 %	—	—	*
Eric Tapia, CFO	(2)	114,574	*	—	—	*
Xiaodi Hou, former CEO	(3)	13,442,314	6.6 %	12,000,000	50%	30.0%
Ersin Yumer, former CEO	(4)	39,248	*	—	—	*
Patrick Dillon, former CFO	(5)	195,219	*	—	—	*
James Mullen, former CALO	(6)	295,947	*	—	—	*
Mo Chen, Executive Chairman	(7)	19,734,628	9.6 %	24,000,000	100%	58.4%
Wendy Hayes		—	—	—	—	—
James Lu		—	—	—	—	—
Michael Mosier		—	—	—	—	—
Tyler McGaughey		—	—	—	—	—
Zhen Tao		—	—	—	—	—
All Executive Officers and Directors as a Group (8 persons)	(8)	22,468,780	11.0 %	24,000,000	100%	59.0%
5% Stockholders:						
Sun Dream Inc.	(9)	24,676,708	12.0 %	—	—	5.5%
TRATON SE	(10)	15,782,220	7.7 %	—	—	3.6%
The Vanguard Group	(11)	12,816,129	6.3 %	—	—	2.9%
BlackRock, Inc.	(12)	11,646,102	5.7 %	—	—	2.6%

* Less than 1 percent.

- Consists of: (i) 1,719,578 shares of Class A Common Stock held by Cheng Lu and (ii) 900,000 shares of Class A Common Stock held by Hickory Wood Grove LLC, a limited liability company incorporated in Delaware and beneficially owned by the Lu Family Descendants Trust.
- Consists of: (i) 76,853 shares of Class A Common Stock held by Mr. Tapia and (ii) 37,721 restricted stock units ("RSUs") that vest within 60 days of August 8, 2023.
- Consists of: (i) 75,000 shares of Class A Common Stock held by Mr. Hou, (ii) 13,367,314 shares of Class A Common Stock held by White Marble LLC, a limited liability company organized in Delaware and beneficially owned by Mr. Hou, (iii) 12,000,000 shares of Class B Common Stock held by White Marble International Limited, a company incorporated in Samoa and beneficially owned by Mr. Hou. The registered address of White Marble International Limited is Sertus Chambers, P.O. Box 603, Apia, Samoa. The Class A Common Stock beneficially owned does not include the shares issuable upon conversion of the Class B Common Stock.
- Consists of 39,248 shares of Class A Common Stock held by Mr. Yumer. Mr. Yumer left the Company in November 2022.
- Consists of: (i) 17,049 shares of Class A Common Stock reported in Form 4 dated June 17, 2022, which was filed on behalf of Mr. Dillon, (ii) distribution of 1,621 vested RSUs in September 2022 and 18,424 vested RSUs in October 2022 for which the vesting was accelerated according to the separation agreement between the Company and Mr. Dillon, and (iii) 158,125 shares of options vested but unexercised as of August 8, 2023, the exercise period of which options was extended to October 17, 2024, according to the separation agreement between the Company and Mr. Dillon. Mr. Dillon left the Company in July 2022, after which the Company no longer has access to track his stock activities.
- Consists of: (i) 43,432 shares of Class A Common Stock reported in Form 4 dated September 19, 2022, which was filed on behalf of Mr. Mullen, (ii) distribution of 65,015 vested RSUs for which the vesting was accelerated according to the separation agreement between the Company and Mr. Mullen, and (iii) 187,500 shares of options vested but unexercised as of August 8, 2023, the exercise period of which options was extended to September 30, 2024 according to the separation agreement between the Company and Mr. Dillon. Mr. Mullen left the Company in September 2022, after which the Company no longer has access to track his stock activities.
- Consists of: (i) 12,000,000 shares of Class B Common Stock held by Gray Jade Holding Limited, a company incorporated in British Virgin Islands and wholly owned by Mo Chen LLC, a limited liability company organized in Delaware, which is wholly owned by The Chen Family Trust having Mr. Chen as its trustee, (ii) 75,000 shares of Class A Common Stock held by THC International Limited, a company incorporated in British Virgin Islands and beneficially owned by Mr. Chen, (iii) 6,292,314 shares of Class A Common Stock held by Brown Jade Holding Limited, a company incorporated in British Virgin Islands and beneficially owned by Mr. Chen, (iv) 13,367,314 shares of Class A Common Stock held by White Marble LLC, and (v) 12,000,000 shares of Class B Common Stock held by White Marble International Limited. The registered address of Gray Jade Holdings Limited is Sertus Chambers, P.O. Box 905, Quastisky Building, Road Town, Tortola, British Virgin Islands. The registered address of THC International Limited is Craigmuir Chambers, Road Town, Tortola, VG 1110, British Virgin Islands. The registered address of Brown Jade Holding Limited is Craigmuir Chambers, Road Town, Tortola, VG 1110, British Virgin Islands. As described above in the section captioned "Voting Agreement," by virtue of the Proxy and the Voting Agreement, Mr. Chen has shared voting power over 13,367,314 shares of Class A Common Stock held by White Marble LLC and 12,000,000 shares of Class B Common Stock held by White Marble International Limited. The Class A Common Stock beneficially owned does not include the shares issuable upon conversion of the shares of the Class B Common Stock.
- Consists of: (i) 22,431,059 shares of Class A Common Stock, (ii) 37,721 RSUs that vest within 60 days of August 8, 2023, and (iii) 24,000,000 shares of Class B Common Stock.

9. Based solely on the Schedule 13G filed by the stockholder with the SEC on February 14, 2022, consists of 24,676,708 shares of Class A Common Stock held by Sun Dream Inc. Sun Dream Inc has sole voting and dispositive power with respect to 24,676,708 shares. Sun Dream Inc is ultimately controlled by Mr. Charles Chao. The registered address of Sun Dream Inc is P. O. Box 31119 Grand Pavilion, Hibiscus Way, 802 West Bay Road, Grand Cayman, KY1-1205, Cayman Islands.
10. Based solely on the Schedule 13G filed by the stockholder with the SEC on July 1, 2021, consists of 15,782,220 shares of Class A Common Stock. TRATON SE has shared voting and dispositive power with respect to 15,782,220 shares. Immediately following the consummation of the transactions contemplated by that certain Agreement and Plan of Merger dated November 7, 2020, by and among Navistar International Corporation, TRATON SE, and Dusk Inc., a Delaware corporation and wholly owned subsidiary of TRATON SE, on July 1, 2021, each of (i) TRATON SE, (ii) Volkswagen Aktiengesellschaft, (iii) TRATON International S.A., (iv) Navistar International Corporation, (v) Navistar, Inc., (vi) International of Mexico Holding Corporation (IMHC), and (vii) International Truck and Engine Corporation Cayman Islands Holding Company may have been deemed to share beneficial ownership in some or all of such securities.
11. Based solely on the Schedule 13G filed by the stockholder with the SEC on February 9, 2023, The Vanguard Group has shared voting power with respect to 76,904 shares, sole dispositive power with respect to 12,648,885 shares and shared dispositive power with respect to 167,244 shares. The business address of The Vanguard Group is 100 Vanguard Blvd., Malvern, PA 19355.
12. Based solely on the Schedule 13G filed by the stockholder with the SEC on February 3, 2023, BlackRock, Inc. has sole voting power with respect to 11,393,298 shares and sole dispositive power with respect to 11,646,102 shares. The business address of BlackRock, Inc. is 55 East 52nd Street, New York, NY 10055.

ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE

Policies and Procedures for Related Party Transactions

We have adopted a written related party transaction policy. This policy provides that our executive officers, directors, holders of more than 5% of any class of our voting securities, and any member of the immediate family of and any entity affiliated with any of the foregoing persons, will not be permitted to enter into a related-party transaction with us without the prior consent of our Audit Committee, or other independent members of our Board in the event it is inappropriate for our Audit Committee to review such transaction due to a conflict of interest. Any request for us to enter into a transaction with an executive officer, director, principal stockholder, or any of their immediate family members or affiliates, in which the amount involved exceeds \$120,000, must first be presented to our Audit Committee for review, consideration, and approval. In approving or rejecting the proposed transactions, our Audit Committee will take into account all of the relevant facts and circumstances available.

Certain Related Party Transactions

In addition to the compensation arrangements with directors and named executive officers described elsewhere in this Annual Report on Form 10-K, the following is a description of each transaction since January 1, 2022 and each currently proposed transaction in which:

- we have been or are to be a participant;
- the amount involved exceeded or exceeds \$120,000; and
- any of our directors, executive officers, holders of more than 5% of our share capital, or any immediate family member of, or person sharing the household with, any of these individuals, had or will have a direct or indirect material interest.

Amended and Restated Stockholders' Agreement

We entered into a stockholders agreement with our stockholders. These stockholders are entitled to rights with respect to the registration of their shares following our initial public offering under the Securities Act.

Indemnification Agreements

Our amended and restated certificate of incorporation contains provisions limiting the liability of directors and provides that we will indemnify each of our directors to the fullest extent permitted under Delaware law. Our amended and restated certificate of incorporation also provides our Board with discretion to indemnify our officers and employees when determined appropriate by our Board.

We have entered into indemnification agreements with each of our directors and executive officers and certain other key employees. The indemnification agreements provide that we will indemnify each of our directors, executive officers, and such other key employees against any and all expenses incurred by that director, executive officer, or other key employee because of his or her status as one of our directors, executive officers, or other key employees, to the fullest extent permitted by Delaware law and our amended and restated certificate of incorporation. In addition, the indemnification agreements provide that, to the fullest extent permitted by Delaware law, we will advance all expenses incurred by our directors, executive officers, and other key employees in connection with a legal proceeding involving his or her status as a director, executive officer, or key employee.

Other Transactions

In connection with our initial public offering, we entered into exchange agreements with our co-founders Mo Chen and Xiaodi Hou, pursuant to which 24,000,000 shares of our Class A Common Stock held by such co-founders, or entities controlled by our founders, were automatically exchanged for an equivalent number of shares of Class B Common Stock immediately prior to the completion of our initial public offering.

Joint Development Agreement

In July 2020, the Company entered into a Joint Development Agreement ("JDA") with Navistar, Inc. ("Navistar"), which is now a subsidiary of TRATON SE, under which the parties agreed to work collaboratively to develop a purpose-built L4 autonomous semi-truck. Under the JDA, the parties grant each other rights to their background intellectual property to permit them to conduct research and development activities. Pursuant to the JDA, we agree to reimburse Navistar up to \$10.0 million for research and development expenses incurred. On December 5, 2022, the Company and Navistar jointly announced an end to the co-development and the JDA.

Internal Investigation / Related Party Transaction

As previously disclosed, based on information obtained in connection with an ongoing internal investigation by our Audit Committee, during 2021, Company employees spent paid hours working on matters for Hydron Inc. ("Hydron") and such paid hours had an estimated value of less than \$300,000. We also believe that during 2022, in connection with our evaluation of Hydron as a potential OEM partner, we shared confidential information with Hydron and its partners before entering into relevant non-disclosure and other cooperation agreements. After the information was disclosed, we entered into a non-disclosure agreement with Hydron that covered the information. Mr. Mo Chen, one of our co-founders and current Executive Chairperson, is a founder, director and chief executive officer of Hydron and he has an equity interest in us of greater than 10%. This related party transaction and the evaluation of Hydron as a potential OEM partner was not presented to, or approved by, the Audit Committee as required by Company policies.

Our internal review regarding the information shared is ongoing and, based upon the facts from the review to date, we believe that the information shared was not source code, was not the confidential information of our partners or suppliers and was consistent with information we normally share with our vendors. We are not currently partnering with, or party to any agreement with Hydron.

ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES

The following table sets forth all fees incurred for professional audit services and other services rendered by the Company's previous auditor, KPMG LLP, during the years ended December 31, 2021 and 2022 (in thousands):

	2021	2022
Audit Fees ⁽¹⁾	\$ 930	\$ 1,198
Audit-Related Fees ⁽²⁾	—	—
Tax Fees ⁽³⁾	93	119
All Other Fees ⁽⁴⁾	—	—
Total Fees	\$ 1,023	\$ 1,317

(1) Audit Fees: This category includes fees for professional services provided in connection with the audit of our financial statements, review of our quarterly financial statements, and audit services provided in connection with other regulatory filings. This category also includes fees for services incurred in connection with our initial public offering.

(2) Audit-Related Fees: No such fees were incurred.

(3) Tax Fees: This includes fees for transfer pricing services and consultation on tax matters.

(4) All Other Fees: No such fees were incurred.

Change of Independent Registered Public Accounting Firm

As disclosed in our Current Report on Form 8-K, filed on May 11, 2023 with the SEC, on May 10, 2023, our Audit Committee approved the appointment of UHY LLP ("UHY") as the Company's new independent registered public accounting firm. During the Company's two most recent fiscal years (fiscal years ended December 31, 2021 and December 31, 2022) and the subsequent interim period through May 10, 2023, neither the Company nor anyone on its behalf consulted UHY regarding any of the matters set forth in Item 304(a)(2)(i) or (ii) of Regulation S-K.

Pre-Approval of Audit and Non-Audit Services

Consistent with requirements of the SEC and the Public Company Accounting Oversight Board regarding auditor independence, our Audit Committee is responsible for the appointment, compensation and oversight of the work of our independent registered public accounting firm. In recognition of this responsibility, our Audit Committee, or the chair, if such approval is needed between meetings of the audit committee, generally pre-approves all audit and permissible non-audit services provided by the independent registered public accounting firm. These services may include audit services, audit-related services, tax services, and other services.

PART IV

ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES.

- a) Documents Filed with Report.
 - 1) Financial Statements
 - 2) Financial Statement Schedules. All financial statement schedules have been omitted because the information required to be presented in them is not applicable or is shown in the financial statements or related notes, which is incorporated herein by reference
 - 3) Exhibits

Exhibit Number	Description	Incorporated by Reference				Filed Herewith
		Form	File No.	Exhibit	Filing Date	
3.1	Amended and Restated Certificate of Incorporation.	10-Q	001-40326	3.1	5/11/2021	
3.2	Amended and Restated Bylaws.	10-Q	001-40326	3.2	5/11/2021	
4.1	Description of the Registrant's Securities Registered Pursuant to Section 12 of the Exchange Act of 1934					X
10.1	Form of Indemnification Agreement between the Registrant and each of its directors and executive officers.	S-1	333-254616	10.1	3/23/2021	
10.2	Ordinary Share Purchase Agreement by and between the Registrant and Classic Elite Limited dated January 8, 2021.	S-1	333-254616	10.9	3/23/2021	
10.3	Ordinary Share Purchase Agreement by and between the Registrant and Perry Creek Capital Partners LP dated January 22, 2021.	S-1	333-254616	10.10	3/23/2021	
10.4	Ordinary Share Purchase Agreement by and between the Registrant and Perry Creek Capital Fund II LP dated January 22, 2021.	S-1	333-254616	10.11	3/23/2021	
10.5	Series E-2 Preferred Stock Purchase Agreement by and among the Registrant, TRATON International S.A. and other parties thereto dated February 26, 2021.	S-1	333-254616	10.12	3/23/2021	
10.6	2017 Share Plan and forms of agreements thereunder.	S-1	333-254616	10.13	3/23/2021	
10.7	2021 Equity Incentive Plan and forms of agreements thereunder.	S-1	333-254616	10.14	3/23/2021	
10.8	2021 Employee Stock Purchase Plan.	S-1	333-254616	10.15	3/23/2021	
10.9	Employment Agreement, dated as of March 22, 2021, by and between Xiaodi Hou and the Registrant.	S-1	333-254616	10.18	3/23/2021	
10.1	Employment Agreement, dated as of March 22, 2021, by and between Patrick Dillon and the Registrant.	S-1	333-254616	10.20	3/23/2021	
10.11	Employment Agreement, dated as of March 22, 2021, by and between James Mullen and the Registrant.	S-1	333-254616	10.21	3/23/2021	
10.12	Severance and Change in Control Agreement, dated as of March 22, 2021, by and between Xiaodi Hou and the Registrant.	S-1	333-254616	10.23	3/23/2021	
10.13	TuSimple Holdings Inc. 2023 Senior Management Severance and Change in Control Plan	8-K	001-40326	10.1	5/30/2023	
10.14	Transition and Separation Agreement dated as of March 2, 2022 by and between TuSimple Holdings Inc. and Cheng Lu.	8-K	001-40326	10.1	3/3/2022	
10.15	Separation Agreement dated as of June 15, 2022 by and between TuSimple Holdings Inc. and Patrick Dillon.	8-K	001-40326	10.1	6/21/2022	
10.16	Form of Separation Agreement between TuSimple Holdings, Inc. and James Mullen.	8-K	001-40326	10.1	9/6/2022	
10.17	Separation Agreement by and between TuSimple Holdings, Inc. and Ersin Yumer, dated November 15, 2022.	8-K	001-40326	10.1	11/16/2022	
10.18	Amendment to TuSimple Holdings Inc. 2021 Equity Incentive Plan.	8-K	001-40326	10.1	12/16/2022	
10.19	Letter Agreement by and between TuSimple Holdings Inc. and Cheng Lu, dated December 14, 2022.	8-K	001-40326	10.2	12/16/2022	
10.20	Severance and Change in Control Agreement by and between TuSimple Holdings Inc. and Cheng Lu, dated December 14, 2022.	8-K	001-40326	10.3	12/16/2022	
21.1	List of Subsidiaries					X
23.1	Consent of Independent Registered Accounting Firm.					X
24.1	Power of Attorney (contained in the signature page to this report)					X
31.1	Certification of Principal Executive Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
31.2	Certification of Principal Financial Officer Pursuant to Rules 13a-14(a) and 15d-14(a) under the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002.					X
32.1*	Certification of Principal Executive Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
32.2*	Certification of Principal Financial Officer Pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002.					X
101.INS	Inline XBRL Instance Document – the instance document does not appear in the Interactive Data File because XBRL tags are embedded within the Inline XBRL document.					X
101.SCH	Inline XBRL Taxonomy Extension Schema Document					X
101.CAL	Inline XBRL Taxonomy Extension Calculation Linkbase Document					X
101.DEF	Inline XBRL Taxonomy Extension Definition Linkbase Document					X
101.LAB	Inline XBRL Taxonomy Extension Label Linkbase Document					X
101.PRE	Inline XBRL Taxonomy Extension Presentation Linkbase Document					X
104	Cover Page Interactive Data File (formatted as inline XBRL and contained in Exhibit 101)					X

* The certifications attached as Exhibit 32.1 and 32.2 that accompany this Annual Report on Form 10-K are not deemed filed with the Securities and Exchange Commission and are not to be incorporated by reference into any filing of TuSimple Holdings Inc. under the Securities Act of 1933, as amended, or the Securities Exchange Act of 1934, as amended, whether made before or after the date of this Annual Report on Form 10-K, irrespective of any general incorporation language contained in such filing.

b) Exhibits. See Item 15(a)(3) above.

c) Financial Statement Schedules. See Item 15(a)(2) above.

ITEM 16. FORM 10-K SUMMARY

None.

SIGNATURES

Pursuant to the requirements of Sections 13 or 15(d) the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned, thereunto duly authorized.

TUSIMPLE HOLDINGS INC.

By: /s/ Cheng Lu

Name: Cheng Lu

Title: *Chief Executive Officer*

POWER OF ATTORNEY

KNOW ALL PERSONS BY THESE PRESENTS, that each person whose signature appears below hereby constitutes and appoints Cheng Lu and Eric Tapia, and each of them, as his or her true and lawful attorney-in-fact and agent with full power of substitution, for him or her in any and all capacities, to sign any and all amendments to this Annual Report on Form 10-K, and to file the same, with all exhibits thereto and other documents in connection therewith, with the SEC, granting unto said attorney-in-fact and agent full power and authority to do and perform each and every act and thing requisite and necessary to be done in connection therewith, as fully for all intents and purposes as he or she might or could do in person, hereby ratifying and confirming all that said attorney-in-fact and agent, or his substitute, may lawfully do or cause to be done by virtue hereof.

Pursuant to the requirements of the Securities Act of 1934, this report has been signed by the following persons on behalf of the registrant and in the capacities and on the dates indicated.

<u>Signature</u>	<u>Title</u>	<u>Date</u>
<u>/s/ Mo Chen</u> Mo Chen	Director, Co-Founder and Executive Chairman	September 7, 2023
<u>/s/ Cheng Lu</u> Cheng Lu	Director and Chief Executive Officer (Principal Executive Officer)	September 7, 2023
<u>/s/ Eric Tapia</u> Eric Tapia	Chief Financial Officer (Principal Financial Officer)	September 7, 2023
<u>/s/ James Lu</u> James Lu	Director	September 7, 2023
<u>/s/ Wendy Hayes</u> Wendy Hayes	Director	September 7, 2023
<u>/s/ Michael Mosier</u> Michael Mosier	Director	September 7, 2023
<u>/s/ Zhen Tao</u> Zhen Tao	Director	September 7, 2023
<u>/s/ J. Tyler McGaughey</u> J. Tyler McGaughey	Director	September 7, 2023

