UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, DC 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended September 30, 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	**86-2341575**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)
9191 Towne Centre Drive, Suite 600 San Diego, CA	**92122**
(Address of principal executive offices)	**(Zip Code)**

Registrant's telephone number, including area code: (619) 916-3144

Securities registered pursuant to Section 12(b) of the Act:

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

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, 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	☐	Accelerated filer	☐
Non-accelerated filer	☒	Smaller reporting company	☐
Emerging growth company	☒		

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 is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of June 30, 2023, the number of shares of the registrant's Class A common stock outstanding was 204,336,269 and the number of shares of the registrant's Class B common stock outstanding was 24,000,000.

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EXPLANATORY NOTE

As previously reported, we were unable to file this report, as well as our Annual Report on Form 10-K for the year ended December 31, 2022 and our Quarterly Report on Form 10-Q for the quarter ended on March 31, 2023, with the Securities and Exchange Commission ("SEC") on a timely basis, and we foresee being unable to timely file our Quarterly Report on Form 10-Q for the quarter ended on June 30, 2023 as a result of our prior independent registered public accounting firm's resignation on November 17, 2022. An overview of certain developments that occurred since November 17, 2022 is included in this Quarterly Report on Form 10-Q in Part I, Item 1, Note 9, under "Subsequent Events," in Part I, Item 2, under "Recent Developments" and in Part II, 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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q 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 ("AFN");
- our ability to attract new users to our products and services;
- our ability to increase reservations for our purpose-built Level 4 ("L4") autonomous semi-trucks;
- 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 Quarterly Report on Form 10-Q.

You should not rely upon forward-looking statements as predictions of future events. We have based the forward-looking statements contained in this Quarterly Report on Form 10-Q 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 Item 1A. “Risk Factors,” in this Quarterly Report on Form 10-Q and in our Annual Report on Form 10-K for the year ended December 31, 2021 filed with the Securities and Exchange Commission (the "SEC") on February 24, 2022. 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 Quarterly Report on Form 10-Q may not occur and actual results could differ materially 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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q to reflect events or circumstances after the date of this Quarterly Report on Form 10-Q 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.

PART I—FINANCIAL INFORMATION

Item 1. Financial Statements.

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

	December 31, 2021	September 30, 2022
ASSETS		
Current assets:		
Cash and cash equivalents	$ 1,337,586	$ 871,360
Short-term investments	—	197,786
Accounts receivable, net	1,599	2,988
Prepaid expenses and other current assets	13,995	18,582
Total current assets	1,353,180	1,090,716
Property and equipment, net	36,053	38,226
Operating lease right-of-use assets	—	46,370
Other assets	7,090	4,951
Total assets	$ 1,396,323	$ 1,180,263
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 4,544	$ 6,666
Amounts due to joint development partners	7,394	4,791
Accrued expenses and other current liabilities	41,698	40,412
Short-term debt	1,524	1,613
Capital lease liabilities, current	766	—
Operating lease liabilities, current	—	5,983
Total current liabilities	55,926	59,465
Capital lease liabilities, noncurrent	2,872	—
Operating lease liabilities, noncurrent	—	41,920
Long-term debt	5,543	4,086
Other liabilities	5,004	6,026
Total liabilities	69,345	111,497
Commitments and contingencies (Note 4)		
Stockholders' equity:		
Preferred stock, $0.0001 par value; 100,000,000 shares authorized as of December 31, 2021 and September 30, 2022; zero shares issued and outstanding as of December 31, 2021 and September 30, 2022	—	—
Common stock, $0.0001 par value; 4,876,000,000 Class A shares authorized as of December 31, 2021 and September 30, 2022; 197,833,195 and 201,096,947 Class A shares issued and outstanding as of December 31, 2021 and September 30, 2022, respectively; 24,000,000 Class B shares authorized as of December 31, 2021 and September 30, 2022; 24,000,000 Class B shares issued and outstanding as of December 31, 2021 and September 30, 2022	22	22
Additional paid-in-capital	2,464,730	2,544,499
Accumulated other comprehensive income (loss)	77	(4,436)
Accumulated deficit	(1,137,851)	(1,471,319)
Total stockholders’ equity	1,326,978	1,068,766
Total liabilities and stockholders’ equity	$ 1,396,323	$ 1,180,263

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

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2022	2021	2022
Revenue	$ 1,785	$ 2,653	$ 4,211	$ 7,511
Cost of revenue	3,487	5,436	8,715	15,292
Gross loss	(1,702)	(2,783)	(4,504)	(7,781)
Operating expenses:				
Research and development	84,506	84,931	204,774	248,608
Selling, general and administrative	29,741	31,119	86,166	85,351
Total operating expenses	114,247	116,050	290,940	333,959
Loss from operations	(115,949)	(118,833)	(295,444)	(341,740)
Change in fair value of warrants liability	—	—	(326,900)	—
Gain on loan extinguishment	—	—	4,183	—
Interest income	452	5,545	1,123	7,912
Other income (expense), net	7	127	(141)	169
Loss before provision for income taxes	(115,490)	(113,161)	(617,179)	(333,659)
Provision for income taxes	—	—	—	—
Net loss	(115,490)	(113,161)	(617,179)	(333,659)
Accretion of redeemable convertible preferred stock	—	—	(4,135)	—
Net loss attributable to common stockholders	$ (115,490)	$ (113,161)	$ (621,314)	$ (333,659)
Net loss per share attributable to common stockholders, basic and diluted	$ (0.54)	$ (0.50)	$ (4.08)	$ (1.49)
Weighted-average shares used in computing net loss per share attributable to common stockholders, basic and diluted	212,802,379	224,745,672	152,469,098	223,698,744

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

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	**2022**	**2021**	**2022**
Net loss	$ (115,490)	$ (113,161)	$ (617,179)	$ (333,659)
Other comprehensive income (loss):				
Unrealized net loss on available-for-sale securities	—	(2,086)	—	(2,086)
Foreign currency translation adjustment	(73)	(1,281)	63	(2,427)
Comprehensive loss	$ (115,563)	$ (116,528)	$ (617,116)	$ (338,172)

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

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

	Redeemable Convertible Preferred Stock		Common Stock					
	Shares	Amount	Shares	Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity (Deficit)
Balance as of December 31, 2020	102,074,703	$ 664,791	60,543,337	$ 6	$ —	$ (301)	$ (405,178)	$ (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 the exercise of warrants	9,477,073	379,084	—	—	—	—	—	—
Issuance of Series E-2 redeemable convertible preferred stock from the exercise of warrants	4,331,644	173,275	—	—	—	—	—	—
Issuance of common stock from exercise of options	—	—	60,616	—	1	—	—	1
Vesting of early exercised stock options	—	—	—	—	21	—	—	21
Accretion of redeemable convertible preferred stock to redemption value	—	4,135	—	—	(4,135)	—	—	(4,135)
Stock-based compensation	—	—	—	—	6,289	—	—	6,289
Foreign currency translation adjustment	—	—	—	—	—	911	—	911
Net loss	—	—	—	—	—	—	(385,160)	(385,160)
Balance as of March 31, 2021	120,534,419	1,282,916	60,603,953	6	2,176	610	(790,338)	(787,546)
Vesting of early exercised stock options	—	—	—	—	21	—	—	21
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
Issuance of common stock in connection with initial public offering, net of offering costs	—	—	27,027,027	3	1,027,371	—	—	1,027,374
Issuance of common stock related to private placement	—	—	874,999	—	35,000	—	—	35,000
Stock-based compensation	—	—	—	—	52,509	—	—	52,509
Foreign currency translation adjustment	—	—	—	—	—	(775)	—	(775)
Net loss	—	—	—	—	—	—	(116,529)	(116,529)
Balance as of Balance as of June 30, 2021	—	—	209,040,398	21	2,399,981	(165)	(906,867)	1,492,970
Vesting of early exercised stock options	—	—	—	—	21	—	—	21
Issuance of common stock related to option exercise	—	—	183,648	—	529	—	—	529
Issuance of common stock related to release of RSUs and SVAs	—	—	3,770,784	—	—	—	—	—
Stock-based compensation	—	—	—	—	32,082	—	—	32,082
Foreign currency translation adjustment	—	—	—	—	—	(73)	—	(73)
Net loss	—	—	—	—	—	—	(115,490)	(115,490)
Balance as of September 30, 2021	—	$ —	212,994,830	$ 21	$ 2,432,613	$ (238)	$ (1,022,357)	$ 1,410,039

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

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

	Common Stock					
	Shares	Amount	Additional Paid-in Capital	Accumulated Other Comprehensive Income (Loss)	Accumulated Deficit	Total Stockholders' Equity
Balance as of December 31, 2021	221,833,195	$ 22	$ 2,464,730	$ 77	$ (1,137,851)	$ 1,326,978
Adjustments for prior periods from adopting ASC 842	—	—	—	—	191	191
Issuance of common stock from exercise of options	534,019	—	871	—	—	871
Issuance of common stock from release of RSUs and SVAs	537,980	—	—	—	—	—
Issuance of common stock under the Employee Stock Purchase Plan	87,215	—	1,292	—	—	1,292
Vesting of early exercised stock options	—	—	21	—	—	21
Stock-based compensation	—	—	27,527	—	—	27,527
Foreign currency translation adjustment	—	—	—	199	—	199
Net loss	—	—	—	—	(111,903)	(111,903)
Balance as of March 31, 2022	222,992,409	22	2,494,441	276	(1,249,563)	1,245,176
Issuance of common stock from exercise of options	262,548	—	687	—	—	687
Issuance of common stock from release of RSUs and SVAs	937,573	—	—	—	—	—
Vesting of early exercised stock options	—	—	21	—	—	21
Stock-based compensation	—	—	25,151	—	—	25,151
Foreign currency translation adjustment	—	—	—	(1,345)	—	(1,345)
Net loss	—	—	—	—	(108,595)	(108,595)
Balance as of June 30, 2022	224,192,530	22	2,520,300	(1,069)	(1,358,158)	1,161,095
Issuance of common stock from exercise of options	125,175	—	152	—	—	152
Issuance of common stock from release of RSUs and SVAs	616,626	—	—	—	—	—
Issuance of common stock under the Employee Stock Purchase Plan	162,616	—	994	—	—	994
Vesting of early exercised stock options	—	—	21	—	—	21
Stock-based compensation	—	—	23,032	—	—	23,032
Unrealized loss on available-for-sale debt securities, net	—	—	—	(2,086)	—	(2,086)
Foreign currency translation adjustment	—	—	—	(1,281)	—	(1,281)
Net loss	—	—	—	—	(113,161)	(113,161)
Balance as of September 30, 2022	225,096,947	$ 22	$ 2,544,499	$ (4,436)	$ (1,471,319)	$ 1,068,766

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

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

	Nine Months Ended September 30,	
	2021	**2022**
Cash flows from operating activities:		
Net loss	$ (617,179)	$ (333,659)
Adjustments to reconcile net loss to net cash used in operating activities:		
Stock-based compensation	90,880	75,710
Depreciation and amortization	6,768	8,335
Noncash operating lease expense	—	3,931
Accretion of discount on short-term investments, net	—	(383)
Change in fair value of warrants liability	326,900	—
Gain on loan extinguishment	(4,183)	—
Other adjustments	—	122
Changes in operating assets and liabilities:		
Accounts receivable	(560)	(1,545)
Prepaid expenses and other current assets	(12,114)	(3,738)
Other assets	(659)	2,279
Accounts payable	(313)	3,136
Amounts due to joint development partners	5,642	(2,603)
Accrued expenses and other current liabilities	16,488	(3,632)
Operating lease liabilities	—	(3,927)
Other liabilities	1,965	(17)
Net cash used in operating activities	(186,365)	(255,991)
Cash flows from investing activities:		
Purchases of property and equipment	(12,218)	(9,809)
Purchases of short-term investments	—	(200,162)
Purchases of intangible assets	(302)	(196)
Proceeds from disposal of property and equipment	100	27
Net cash used in investing activities	(12,420)	(210,140)
Cash flows from financing activities:		
Proceeds from issuance of redeemable convertible preferred stock, net of offering costs	54,693	—
Proceeds from the issuance of common stock under the Employee Stock Purchase Plan	—	2,286
Proceeds from exercise of warrants for redeemable convertible preferred stock	183,007	—
Proceeds from exercised stock options	782	1,710
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	—
Return of guarantee deposit on related party loan	3,715	—
Principal payments on related party loan	(4,398)	—
Payment of third-party costs in connection with initial public offering	(2,812)	—
Principal payments on capital lease obligations	(586)	—
Principal payments on finance lease obligations	—	(929)
Principal payments on loans	(353)	(1,126)
Net cash provided by financing activities	1,300,013	1,941
Effect of exchange rate changes on cash, cash equivalents, and restricted cash	55	(1,931)
Net increase (decrease) in cash, cash equivalents, and restricted cash	1,101,283	(466,121)
Cash, cash equivalents, and restricted cash - beginning of period	312,351	1,339,092
Cash, cash equivalents, and restricted cash - end of period	$ 1,413,634	$ 872,971

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

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

	Nine Months Ended September 30,	
	2021	**2022**
Reconciliation of cash, cash equivalents, and restricted cash to the condensed consolidated balance sheets:		
Cash and cash equivalents	$ 1,412,128	$ 871,360
Restricted cash included in prepaid expenses and other current assets	1,506	1,611
Total cash, cash equivalents, and restricted cash	$ 1,413,634	$ 872,971
Supplemental disclosure of cash flow information:		
Cash paid for interest	$ 575	$ 681
Supplemental schedule of non-cash investing and financing activities:		
Acquisitions of property and equipment included in liabilities	$ 1,987	$ 3,783
Accretion of redeemable convertible preferred stock	$ 4,135	$ —
Vesting of early exercised stock options	$ 63	$ 63
Exercise of liability-classified warrants	$ 369,352	$ —
Conversion of redeemable convertible preferred stock to common stock upon initial public offering	$ 1,282,916	$ —
Issuance costs incurred in connection with initial public offering included in current liabilities	$ 779	$ —

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

TuSimple Holdings Inc.
Notes to Unaudited Condensed 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. Founded in 2015, TuSimple is developing a commercial-ready, fully autonomous (SAE Level 4) driving solution for long-haul heavy-duty trucks.

Basis of Presentation and Consolidation

The accompanying unaudited condensed 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 interim 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. These Financial Statements should be read in conjunction with the audited consolidated financial statements and notes as of and for the year ended December 31, 2021, included in the Company's Annual Report on Form 10-K.

The condensed consolidated balance sheet as of December 31, 2021 was derived from the audited consolidated financial statements as of that date, but does not include all disclosures required by GAAP. In management’s opinion, the accompanying Financial Statements reflect all normal recurring adjustments necessary for their fair presentation. Other than described below, there have been no changes to the Company’s significant accounting policies described in the Annual Report on Form 10-K for the year ended December 31, 2021 that have had a material impact on the Company’s Financial Statements.

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 condensed consolidated balance sheets based on the term of the remaining restriction.

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 our 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 periods presented.

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, short-term and long-term debt. The estimated fair value of these instruments approximates their carrying value due to their short-term nature. Refer to Note 2. Investments and Fair Value Measurements for further information.

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 condensed 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 condensed consolidated balance sheets.

The Company evaluates its available-for-sale debt securities to determine whether there is a decline in the fair value below its amortized cost basis (an impairment) at each reporting period. This evaluation consists of several qualitative and quantitative factors regarding the severity and duration of the unrealized loss as well as the Company’s ability and intent to hold the investment until a forecasted recovery occurs. Factors considered include: recent financial results and operating trends; implied values in recent transactions of investee securities; other publicly available information that may affect the value of the Company’s investments; severity and length of the decline in value; and the Company’s strategy and intentions for holding the investment.

Impairment of the Company’s debt securities is recognized in earnings when a decline in value has occurred that is deemed to be other than temporary, and the current fair value becomes the new cost basis for the security. If the Company does not intend to sell a security and it is not more likely than not that it will be required to sell the security before recovery, the unrealized loss is separated into an amount representing the credit loss, which is recognized in earnings, and the amount related to all other factors, which is recorded in accumulated other comprehensive income (loss).

Leases

The Company accounts for leases in accordance with Accounting Standards Codification ("ASC") 842, *Leases* ("ASC 842"), which requires lessees to recognize on-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 in 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”) because the interest rate implicit in most of the Company’s leases is not 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, the Company has determined that certain leases previously identified as build-to-suit leasing arrangements under legacy accounting, were derecognized pursuant to the transition guidance provided for build-to-suit leases in ASC 842. Accordingly, these leases have been reassessed as operating leases as of the adoption date under ASC 842, and are included on the condensed consolidated balance sheet as of September 30, 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 condensed consolidated balance sheet as of September 30, 2022. Finance leases are included in property and equipment, net, accrued expenses and other current liabilities, and other liabilities on the Company's condensed consolidated balance sheet as of September 30, 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 interim unaudited condensed 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 condensed consolidated statement of operations and condensed consolidated statement of cash flows.

Reclassifications

Certain prior period balances have been reclassified to conform to the current period presentation in the condensed 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.

Recently Issued Accounting Pronouncements

There have been no recent accounting pronouncements since the filing of the Company's Annual Report on Form 10-K for the year ended December 31, 2021, that may have a material impact on the Company's unaudited condensed consolidated financial statements.

Note 2. Investments and Fair Value Measurements

Investments

Investments in debt securities as of September 30, 2022 were as follows (in thousands):

	As of September 30, 2022					
	Amortized Cost	**Gross Unrealized Gains**	**Gross Unrealized Losses**	**Fair Value**	**Cash Equivalents**	**Short-term Investments**
Available-for-sale debt securities:						
U.S. treasury securities	$ 9,769	$ —	$ (80)	$ 9,689	$ —	$ 9,689
U.S. government agency securities	105,097	3	(281)	104,819	80,317	24,502
Commercial paper	130,993	—	(206)	130,787	76,704	54,083
Corporate debt securities	116,876	—	(1,522)	115,354	5,842	109,512
Total	$ 362,735	$ 3	$ (2,089)	$ 360,649	$ 162,863	$ 197,786

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):

	September 30, 2022	
	Amortized Cost	Fair Value
Due in one year or less	$ 255,526	$ 255,007
Due in one year through five years	107,209	105,642
Total	$ 362,735	$ 360,649

As of September 30, 2022, investments in an unrealized loss position for which other-than-temporary impairments have not been recognized had an aggregate fair value of $320.3 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 and it is not more likely than not that the Company will be required to sell these investments before recovery of their amortized cost basis. The Company anticipates that it will recover the entire amortized cost basis of these investments on or before maturity. During the three and nine months ended September 30, 2022, the Company did not recognize any other-than-temporary impairment losses on these securities.

Interest income from cash and cash equivalents and short-term investments was $0.5 million and $1.1 million for the three and nine months ended September 30, 2021, and $5.5 million and $7.9 million for the three and nine months ended September 30, 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 September 30, 2022			
	Total	Level 1	Level 2	Level 3
Assets:				
Cash equivalents:				
Money market funds	$ 640,978	$ 640,978	$ —	$ —
U.S. government agency securities	80,317	—	80,317	—
Commercial paper	76,704	—	76,704	—
Corporate debt securities	5,842	—	5,842	—
Total cash equivalents	$ 803,841	$ 640,978	$ 162,863	$ —
Short-term investments:				
U.S. treasury securities	$ 9,689	$ 9,689	$ —	$ —
U.S. government agency securities	24,502	—	24,502	—
Commercial paper	54,083	—	54,083	—
Corporate debt securities	109,512	—	109,512	—
Total short-term investments	$ 197,786	$ 9,689	$ 188,097	$ —
Total	$ 1,001,627	$ 650,667	$ 350,960	$ —

	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 then existing warrants liability was remeasured using the Black-Scholes option-pricing model, resulting in a loss upon remeasurement of $326.9 million. The warrants exercised by TRATON represented only a portion of their total and the unexercised warrants expired as of the exercise date. As of September 30, 2022, there were no warrants outstanding.

The Company used the following assumptions in the model:

	As of	
	February 26, 2021	**March 19, 2021**
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%

Note 3. Balance Sheet Components

Property and Equipment, Net

Property and equipment, net as of December 31, 2021 and September 30, 2022, was as follows (in thousands):

	As of	
	December 31, 2021	**September 30, 2022**
Electronic equipment	$ 12,761	$ 14,690
Office and other equipment	9,423	15,195
Vehicles	21,043	18,912
Leasehold improvements	11,984	13,058
Buildings	—	1,841
Construction in progress	5,258	2,788
Property and equipment, gross	60,469	66,484
Accumulated depreciation and amortization	(24,416)	(28,258)
Property and equipment, net	$ 36,053	$ 38,226

Depreciation and amortization expense was $2.3 million and $6.7 million for the three and nine months ended September 30, 2021, respectively, and $2.8 million and $8.3 million for the three and nine months ended September 30, 2022, respectively.

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 September 30, 2022, property and equipment under finance leases was $6.5 million, net of accumulated amortization of $1.1 million.

Accrued Expenses and Other Current Liabilities

Accrued expenses and other current liabilities as of December 31, 2021 and September 30, 2022 were as follows (in thousands):

	As of	
	December 31, 2021	**September 30, 2022**
Accrued payroll	$ 33,225	$ 27,036
Accrued information technology services	1,625	3,438
Accrued professional fees	1,938	1,769
Finance lease liabilities, current	—	1,258
Other	4,910	6,911
Accrued expenses and other current liabilities	$ 41,698	$ 40,412

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 September 30, 2022
Operating leases:	
Operating lease right-of-use assets	$ 46,370
Operating lease liabilities, current	$ 5,983
Operating lease liabilities, noncurrent	41,920
Total operating lease liabilities	$ 47,903
Finance leases:	
Property and equipment, at cost	$ 7,667
Accumulated depreciation	(1,123)
Property and equipment, net	$ 6,544
Accrued expenses and other current liabilities	$ 1,258
Other liabilities	5,661
Total finance lease obligations	$ 6,919

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

	Three Months Ended September 30, 2022	**Nine Months Ended September 30, 2022**
Operating lease expense:		
Operating lease expense (1)	$ 2,105	$ 6,395
Finance lease expense:		
Amortization of leased assets	$ 384	$ 1,111
Interest on lease liabilities	139	438
Total finance lease expense	$ 523	$ 1,549
Total lease expense	$ 2,628	$ 7,944

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

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

	As of September 30, 2022
Weighted-average remaining lease term:	
Operating leases	8.6 years
Finance leases	5.6 years
Weighted-average discount rate:	
Operating leases	4.4 %
Finance leases	9.1 %

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

	Nine Months Ended September 30, 2022
Cash paid for amounts included in the measurement of lease liabilities:	
Operating cash flows from operating leases	$ 5,369
Operating cash flows from finance leases (interest payments)	$ 326
Financing cash flows from finance leases	$ 929
Right-of-use assets obtained in exchange for lease obligations:	
Operating lease liabilities	$ 48,404
Finance lease liabilities	$ 7,772

As of September 30, 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
Remainder of 2022	$ 1,432	$ 453
2023	7,993	1,664
2024	7,592	1,669
2025	7,452	2,468
2026	7,658	421
Thereafter	28,106	1,911
Total minimum lease payments	60,233	8,586
Less: lease incentive receivable[1]	(1,488)	—
Less: imputed interest	(10,842)	(1,667)
Present value of minimum lease payments	47,903	6,919
Less: current portion	(5,983)	(1,258)
Lease obligations, noncurrent	$ 41,920	$ 5,661

(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 September 30, 2022, the Company has additional leases for facilities that have not yet commenced with lease obligations of $0.7 million. These leases will commence between 2022 and 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 Leases
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	$ 49,685	4,955
Amount representing interest		(1,317)
Present value of minimum lease payments		$ 3,638

Note 4. Commitments and Contingencies

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. 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.

The complaint in the August 2022 Action may be amended at a future date to add additional or alternate allegations regarding liability or alternate or additional claims for relief. 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.

Note 5. Stock-Based Compensation

Equity Compensation Plans

The Company maintains three equity compensation plans that provide for the issuance of shares of its Class A common stock to its employees, directors, and consultants: the 2017 Share Plan (the "2017 Plan"), the 2021 Equity Incentive Plan (the "2021 Plan"), and the 2021 Employee Stock Purchase Plan (the "2021 ESPP"), which have all been approved by the board of directors. Following the Company's initial public offering ("IPO") in 2021, the 2017 Plan was terminated, but continues to govern the terms and conditions of the outstanding awards previously granted under the 2017 Plan. Subsequent to the IPO, the Company has only issued awards under the 2021 Plan and the ESPP. These plans provide for the issuance of incentive stock options ("ISOs"), nonstatutory stock options ("NSOs"), restricted shares, restricted stock units ("RSUs"), share value awards ("SVAs"), stock appreciation rights ("SARs"), and other awards.

2021 Employee Stock Purchase Plan

During the nine months ended September 30, 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.

Stock Options

A summary of the stock option activity, including the CEO Performance Award, for the nine months ended September 30, 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	(921,742)	$ 1.88		
Cancelled/Forfeited	(1,974,012)	$ 17.68		
Outstanding at September 30, 2022	4,789,024	$ 13.25	5.27	$ 12,004
Vested and exercisable at September 30, 2022	2,398,336	$ 8.79	5.32	$ 7,612

As of September 30, 2022, there was $14.3 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 2.50 years.

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 "CEO Performance Award"). In March 2022, the Company underwent a change in CEO and the CEO Performance Awards were 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 CEO Performance Awards of $7.1 million. In November 2022, Cheng Lu was reappointed as CEO (refer to Note 9. Subsequent Events).

In connection with the March 2022 separation of Cheng Lu as CEO, a total of 1,850,000 stock options were modified, of which 440,000 were vested as of the modification date. The terms of the modification allow for continued vesting of the unvested stock options for the twelve-month period following the separation date ("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 shall become vested and exercisable. Each of the modified stock options, including those vested and outstanding as of the modification date, shall 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 had their vesting accelerated in full as of the separation date. As a result of these modifications, the Company recorded incremental stock compensation expense of $13.9 million during the nine months ended September 30, 2022.

RSUs

The following table summarizes the activity related to RSUs for the nine months ended September 30, 2022:

	RSUs Outstanding	Weighted-Average Grant Date Fair Value per Share
Unvested and outstanding at December 31, 2021	5,949,798	$ 46.54
Granted	10,355,782	$ 8.79
Vested	(2,019,222)	$ 39.01
Cancelled	(2,086,309)	$ 35.33
Unvested and outstanding at September 30, 2022	12,200,049	$ 17.66
Vested and outstanding at September 30, 2022	115,150	$ 28.28

SVAs

The following table summarizes the activity related to SVAs for the nine months ended September 30, 2022:

	SVAs Outstanding	Weighted-Average Grant Date Fair Value per Share
Unvested and outstanding at December 31, 2021	315,559	$ 5.29
Vested	(172,504)	$ 4.79
Cancelled	(51,781)	$ 2.97
Unvested and outstanding at September 30, 2022	91,274	$ 7.55
Vested and outstanding at September 30, 2022	—	$ —

As of September 30, 2022, there was $191.7 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 2.61 years.

Stock-based Compensation Expense

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2022	2021	2022
Research and development	$ 22,382	$ 16,915	$ 49,520	$ 56,771
Selling, general and administrative	9,700	6,117	41,360	18,939
Total stock-based compensation expense	$ 32,082	$ 23,032	$ 90,880	$ 75,710

Note 6. Income Taxes

The Company’s effective tax rate was 0% for the nine months ended September 30, 2022, which is lower than the U.S. federal rate of 21% and was primarily due to valuation allowances recorded on current year losses. As of September 30, 2022, the Company continues to maintain a full valuation allowance against its U.S. and foreign net deferred tax assets due to significant negative evidence, including cumulative losses in the most recent three-year period and the Company’s assessment that it is not more likely than not that the net deferred tax assets will be realized.

Note 7. Net Loss Per Share Attributable to Common Stockholders

Basic net loss per share of common stock attributable to common stockholders is calculated by dividing net loss attributable to common stockholders by the weighted-average shares of common stock outstanding for the period. Diluted net 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):

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2022	2021	2022
Numerator:				
Net loss	$ (115,490)	$ (113,161)	$ (617,179)	$ (333,659)
Less: Accretion of redeemable convertible preferred stock	—	—	(4,135)	—
Net loss attributable to common stockholders, basic and diluted	$ (115,490)	$ (113,161)	$ (621,314)	$ (333,659)
Denominator:				
Weighted-average shares used in computing net loss per share, basic and diluted	212,802,379	224,745,672	152,469,098	223,698,744
Net loss per share:				
Net loss per share attributable to common stockholders, basic and diluted	$ (0.54)	$ (0.50)	$ (4.08)	$ (1.49)

The following potentially dilutive outstanding shares were excluded from the computation of diluted net loss per share for the periods presented because including them would have had an anti-dilutive effect, or because issuance of such shares is contingent upon the satisfaction of certain conditions which were not satisfied by the end of the period:

	As of September 30,	
	2021	2022
Options to purchase common stock	16,019,239	4,789,024
RSUs subject to future vesting	5,061,779	12,200,049
SVAs subject to future vesting	411,079	91,274
Early exercised options subject to future vesting	45,000	25,000
Common stock contingently issuable under ESPP	—	27,989
Total	21,537,097	17,133,336

Note 8. Related Party Transactions

As previously disclosed by the Company on its Current Report on Form 8-K filed on October 31, 2022, based on information obtained in connection with an ongoing internal investigation by its Audit Committee of the 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.

Although the Company has not provided an interim update since the above disclosure, its internal review regarding the information shared is 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 9. Subsequent Events

Litigation Matters

Shareholder Securities Litigation

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, 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 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 and the Company’s sharing of confidential information and proprietary technology with Hydron without approval from the Company’s 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.).

The complaint in the November 2022 Action may be amended at a future date to add additional or alternate allegations regarding liability or alternate or additional claims for relief.

On May 3, 2023, the Company made a motion to consolidate the August 2022 Action and the November 2022 Action. That motion remains pending.

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.

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 (the "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.

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.

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.

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. The Company intends to take the steps necessary to meet the deadlines for the Delayed Reports and regain compliance with Nasdaq listing standards by the Compliance Date.

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 Company’s board of directors, each effective immediately.

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

On December 14, 2022, the Company granted Cheng Lu 3,425,000 RSUs that vest annually over a period of four years (“CEO Time-Based Award”) and 3,425,000 RSUs that vest annually over a period of four years upon the attainment of certain stock price hurdles (“CEO Performance Award”), in both cases assuming continued employment of CEO through the vesting dates and in exchange for the cancellation and forfeiture of Cheng Lu's 1,850,000 outstanding stock options.

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.

Restructurings

On December 15, 2022, the Board authorized a broad restructuring plan to rebalance the Company's cost structure in alignment with its strategic priorities resulting in a reduction in the size of the Company's workforce by approximately 350 employees and the impairment of certain non-current assets. 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 (together with the December 15, 2022 reduction in force, the "Restructuring Plan"). Following the Restructuring Plan, the Company's global full-time employees ("FTEs") are approximately 750 FTEs, including approximately 250 FTEs in the U.S. operations.

Taken together, the Company estimates that it will incur one-time charges of approximately $33.0 million to $35.0 million in connection with the 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 impairment charges of certain non-current assets.

The foregoing estimates of the charges the Company expects to incur under the 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 2. Management's Discussion and Analysis of Financial Condition and Results of Operations.

The following discussion and analysis of our financial condition and results of operations should be read in conjunction with our unaudited condensed consolidated financial statements and the accompanying notes thereto included elsewhere in this Quarterly Report on Form 10-Q and our audited consolidated financial statements and the accompanying notes thereto included in our Annual Report on Form 10-K for the year ended December 31, 2021. In addition to 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 the section titled "Item 1A. Risk Factors" in this Quarterly Report on Form 10-Q and in our Annual Report on Form 10-K for the year ended December 31, 2021 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 Quarterly Report on Form 10-Q. 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.

We are an autonomous technology company that is working to revolutionize the estimated $4 trillion global truck freight market. We have developed industry-leading autonomous technology specifically designed for semi-trucks, which has enabled us to build the world's first Autonomous Freight Network ("AFN") in partnership with world-class shippers, carriers, railroads, freight brokers, fleet asset owners, and truck hardware partners. We believe that our technology and our AFN will make long haul trucking significantly safer as well as more reliable, efficient, and environmentally friendly, creating significant benefits for all who rely on the freight ecosystem to deliver essential goods.

Our AFN provides autonomous freight capacity as a service through multiple service models based on users' needs. We believe that allowing our users the flexibility to select different service models is critical to providing a superior customer experience and will help drive rapid adoption of our network.

- ***TuSimple Capacity.*** Our fleet of retrofitted and future purpose-built L4 autonomous semi-trucks will serve users that desire access to safe, reliable, low cost, and more environmentally friendly freight transportation, without owning semi-truck assets. Users of TuSimple Capacity can range from relatively smaller users of freight logistics to large shippers, carriers, and railroads seeking to supplement their own captive fleet for incremental freight capacity. We will charge users of TuSimple Capacity a per mile rate to ship freight, which we expect will be at a meaningful discount to prevailing market freight rates. We believe that our competitive advantage in terms of pricing will be enabled by our anticipated cost structure, which is expected to be significantly lower than that of human-operated semi-trucks. Users are expected to benefit directly from lower shipping costs compared to conventional truck freight.
- ***Carrier-Owned Capacity.*** Shippers, carriers, and railroads that prefer to own their fleet will be able to purchase our purpose-built L4 autonomous semi-truck from a semi-truck original equipment manufacturer ("OEM") partner and subscribe to TuSimple Path—a comprehensive turnkey product to enable autonomous operations across our network. TuSimple Path includes features such as our on-board autonomous driving software, TuSimple Connect cloud-based autonomous operations oversight system, HD digital route mapping support, and emergency roadside assistance. Users will pay TuSimple a per mile, usage-based fee for access to TuSimple Path and benefit from lower overall freight costs with an expected payback period of less than one year on their upfront incremental capital investment to purchase our purpose-built L4 autonomous semi-trucks.

We believe that a collaborative approach in partnership with a leading semi-truck OEM, as well as components partners, to build a purpose-built L4 autonomous semi-truck designed and built with integrated auto-grade components and sensors to be operated exclusively on our network will increase our AFN's reliability at scale. Vertically integrating through partnerships with OEMs and Tier 1 suppliers allows us to maintain strong supply chain and hardware design control while remaining capital light and primarily focusing on developing proprietary autonomous technology.

We have developed an ecosystem of shippers, carriers, railroads, freight brokers, fleet asset owners, and third-party service providers that provide validation and enhance the network effect benefits of our approach. We believe the growth of our AFN infrastructure and partnerships will improve our user experience and drive more users to our platform, which we believe will allow us to further densify our strategic terminal network and reinforce rapid network growth.

Recent Developments

Litigation Matters

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 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. 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”) complaint 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 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 Section 10(b) and Section 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 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.).

The complaints in the August 2022 Action and November 2022 Action may be amended at a future date to add additional or alternate allegations regarding liability or alternate or additional claims for relief. On May 3, 2023, we made a motion to consolidate the August 2022 Action and the November 2022 Action. That motion remains pending. 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.

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 our 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 our current and former directors and officers breached their fiduciary duties to us 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 our current and former directors and officers in connection with the restructuring of our board of directors (the "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 our 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 our technology and alleged inadequacy of our 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 our 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, we 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. 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.

Internal Investigation / Related Party Transaction

As previously disclosed, based on information obtained in connection with an ongoing internal investigation by its 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 Chairman, 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.

Although we have not provided an interim update since the above disclosure, 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 by TuSimple U.S. 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.

Regulatory Investigations

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

We are cooperating with an inquiry by CFIUS concerning our compliance with the National Security Agreement (“NSA”) entered into with the U.S. government as it relates to information shared by our U.S-based businesses (“TuSimple U.S”) with our 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 us. We are 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, the Board and the Company are committed to cooperating fully as discussions with CFIUS continue.

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Nasdaq

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

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The Panel has granted us an extension until September 30, 2023 (the “Compliance Date”) to file with the SEC our Quarterly Report on Form 10-Q for the fiscal quarter ended September 30, 2022, our Annual Report on Form 10-K for the fiscal year ended December 31, 2022, our Quarterly Report on Form 10-Q for the fiscal quarter ended March 31, 2023 and our 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. We intend to take the steps necessary to meet the deadlines for the Delayed Reports and regain compliance with Nasdaq listing standards by the Compliance Date.

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On October 30, 2022 our 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.

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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 Company's board of directors, each effective immediately.

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

Restructurings

On December 15, 2022, the Board authorized a broad restructuring plan to rebalance our cost structure in alignment with our strategic priorities resulting in a reduction in the size of our workforce by approximately 350 employees and the impairment of certain non-current assets. On May 16, 2023, the Board authorized an additional restructuring plan to further align our cost structure with our strategic priorities resulting in an additional reduction in our workforce by approximately 300 employees (together with the December 15, 2022 reduction in force, the "Restructuring Plan"). Following the Restructuring Plan, our global full-time employees ("FTEs") are approximately 750 FTEs, including approximately 250 FTEs in the U.S. operations.

Taken together, we estimate that we will incur one-time charges of approximately $33.0 million to $35.0 million in connection with the 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 impairment charges of certain non-current assets.

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

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 September 30,		% Change
	2021	2022	
Research and Development (R&D) Full Time Employees ("FTEs")	~1,000	~1,130	13 %
Global FTEs	~1,300	~1,480	14 %
Patents Issued	357	473	32 %
Cumulative Road Miles (in thousands)(1)	~5,400	~9,000	67 %
Total Truck Reservations (EOQ)(2)	6,875	7,485	9 %
Total Mapped Miles (EOQ)(3)	~9,900	~11,400	15 %
Revenue Miles (in thousands)(4)(5)	~2,430	~3,390	40 %

(1) The total miles our autonomous trucks have run on open public roads. We use this metric to track progress on the development of our L4 autonomous semi-trucks.

(2) The total reservations for our purpose-built L4 semi-trucks. We use this metric to track our customer relationships and demand for our purpose-built L4 autonomous semi-trucks that are in development.

(3) The cumulative unique miles on the AFN of which we have built a map compatible with our autonomous driving software. We use this metric to track progress on the development of our AFN.

(4) The total miles our autonomous trucks have run during the periods presented that generates revenues. We use this metric to track our revenue growth.

(5) Revenue Miles presented above are non-cumulative and represent activity for the nine months ended September 30, 2021 and 2022.

Highlights for Q3 2022

Cumulative Road Miles driven and Total Mapped Miles increased 67% and 15%, respectively, to approximately 9.0 million and approximately 11,400, respectively, as of September 30, 2022 as we continued expansion of our AFN.

Our Patents Issued increased 32% as we continued to add world-class talent to our R&D team.

We ended the quarter with $0.9 billion in cash and cash equivalents and $0.2 billion 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 on our AFN. 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. As we continue to grow and improve our technology, we expect a new revenue stream through our Carrier-Owned Capacity service model. We expect to derive revenue from per-mile fees charged to users of Carrier-Owned Capacity on our AFN. Recognition of this future revenue will be subject to the terms of any arrangements with our partners or users, which have not yet been negotiated. To date, we have not recorded any revenue under the Carrier-Owned Capacity service model.

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. We expect to gradually lower the average number of occupants in our semi-trucks as we continue to improve our autonomous technology and to the extent we ultimately remove all occupants upon achievement of full driver-out, L4 autonomous operations.

Research and Development ("R&D")

R&D costs 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 our autonomous truck driving solutions, depreciation of equipment used in research and development, and allocated overhead costs. R&D costs are expensed as incurred and we expect them to increase in absolute dollars as we increase our investment in scaling our products and services through our proprietary technologies and as we manage our technical workforce, which would impact our personnel-related and stock-based compensation 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, advertising expenses, sponsorship, public relations and other related marketing activities, and other general corporate expenses.

We expect that our SG&A expenses will increase in absolute dollars from period to period as we further scale our products and services, educate market participants on the benefits of autonomous trucking and our autonomous trucking solutions, increase our marketing activities, grow our operations, build brand awareness, and continue to incur costs related to operating as a public company.

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 the nine months ended September 30, 2021, and we recorded one final remeasurement at fair value as of the exercise date.

Gain on Loan Extinguishment

The gain on loan extinguishment for the nine months ended September 30, 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.

On August 16, 2022, the U.S. government enacted the Inflation Reduction Act of 2022 that includes, among other provisions, changes to the U.S. corporate income tax system, including a 15% minimum tax based on “adjusted financial statement income” exceeding $1 billion and a 1% excise tax on net repurchases of stock after December 31, 2022. We are continuing to evaluate the Inflation Reduction Act and its requirements, as well as any potential impact on our business.

Results of Operations

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2022	2021	2022
Revenue	$ 1,785	$ 2,653	$ 4,211	$ 7,511
Cost of revenue	3,487	5,436	8,715	15,292
Gross loss	(1,702)	(2,783)	(4,504)	(7,781)
Operating expenses:				
Research and development (1)	84,506	84,931	204,774	248,608
Selling, general and administrative (1)	29,741	31,119	86,166	85,351
Total operating expenses	114,247	116,050	290,940	333,959
Loss from operations	(115,949)	(118,833)	(295,444)	(341,740)
Change in fair value of warrants liability	—	—	(326,900)	—
Gain on loan extinguishment	—	—	4,183	—
Interest income	452	5,545	1,123	7,912
Other income (expense), net	7	127	(141)	169
Loss before provision for income taxes	(115,490)	(113,161)	(617,179)	(333,659)
Provision for income taxes	—	—	—	—
Net loss	(115,490)	(113,161)	(617,179)	(333,659)
Accretion of redeemable convertible preferred stock	—	—	(4,135)	—
Net loss attributable to common stockholders	$ (115,490)	$ (113,161)	$ (621,314)	$ (333,659)

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

	Three Months Ended September 30,		Nine Months Ended September 30,	
	2021	2022	2021	2022
Research and development	$ 22,382	$ 16,915	$ 49,520	$ 56,771
Selling, general and administrative	9,700	6,117	41,360	18,939
Total stock-based compensation expense	$ 32,082	$ 23,032	$ 90,880	$ 75,710

Comparison of the Three and Nine Months Ended September 30, 2021 and 2022

Revenue

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	2021	2022	% Change	2021	2022	% Change
Revenue	$ 1,785	$ 2,653	49 %	$ 4,211	$ 7,511	78 %

Three Months Ended September 30, 2022 Compared with the Same Period in 2021

Revenue increased by $0.9 million, or 49%, in the three months ended September 30, 2022 compared to the same period in the prior year, 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, and customer mix improvements. During the three months ended September 30, 2022, we expanded our revenue-miles by 28% from the same period in the prior year as a result of expanded routes and commercial partnerships.

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

Revenue increased by $3.3 million, or 78%, in the nine months ended September 30, 2022 compared to the same period in the prior year, 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, and customer mix improvements. During the nine months ended September 30, 2022, we expanded our revenue-miles by 40% from the same period in the prior year as a result of expanded routes and commercial partnerships.

Cost of Revenue

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	2021	2022	% Change	2021	2022	% Change
Cost of revenue	$ 3,487	$ 5,436	56 %	$ 8,715	$ 15,292	75 %

Three Months Ended September 30, 2022 Compared with the Same Period in 2021

Cost of revenue increased by $1.9 million, or 56%, in the three months ended September 30, 2022 compared to the same period in the prior year, primarily due to increased operating costs associated with the generation of revenue, including fuel, truck fleet operating costs, maintenance and driver compensation. Gross loss margin for the three months ended September 30, 2022 was 105%, a deterioration from the gross loss margin for the same period of the prior year of 95%. This deterioration in gross loss margin was primarily a result of increased fuel and insurance costs, which rose faster than our increases in revenue rates.

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

Cost of revenue increased by $6.6 million, or 75%, in the nine months ended September 30, 2022 compared to the same period in the prior year, primarily due to increased operating costs associated with the generation of revenue, including fuel, truck fleet operating costs, maintenance and driver compensation. Gross loss margin for the nine months ended September 30, 2022 was 104%, an improvement from the gross loss margin for the same period of the prior year of 107%. This improvement in gross loss margin was primarily a result of increased revenue-miles per truck, improved customer and truck channel mix, and improved truck utilization and cost leverage, offset slightly by increased fuel and insurance costs.

Research and Development (R&D)

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	2021	2022	% Change	2021	2022	% Change
Research and development	$ 84,506	$ 84,931	1 %	$ 204,774	$ 248,608	21 %

Three Months Ended September 30, 2022 Compared with the Same Period in 2021

R&D expenses increased by $0.4 million, or 1%, in the three months ended September 30, 2022 compared to the same period in the prior year. The increase was primarily attributable to an increase in depreciation and allocated facility costs, purchases for equipment, supplies, and materials, joint development costs, and personnel-related costs mainly driven by an increase in employee headcount in the ordinary course of business. The increase was offset by decreases in vehicle-related costs and stock-based compensation costs.

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

R&D expenses increased by $43.8 million, or 21%, in the nine months ended September 30, 2022 compared to the same period in the prior year. The increase was primarily attributable to an increase in personnel-related costs, mainly driven by an increase in employee headcount in the ordinary course of business and increased stock-based compensation expense. The remainder of the increase in R&D expenses was primarily driven by increases in: depreciation, allocated facility costs, and equipment, supplies, and materials from a higher number of semi-trucks in our fleet.

Selling, General and Administrative (SG&A)

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	2021	2022	% Change	2021	2022	% Change
Selling, general and administrative	$ 29,741	$ 31,119	5 %	$ 86,166	$ 85,351	(1)%

Three Months Ended September 30, 2022 Compared with the Same Period in 2021

SG&A expenses increased by $1.4 million, or 5%, in the three months ended September 30, 2022 compared to the same period in the prior year. The increase was primarily attributable to increases in: office and facility-related costs, information technology costs, and legal, accounting and other professional services as we expand our business processes and operational capabilities in line with our status as a public reporting company.

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

SG&A expenses decreased by $0.8 million, or 1%, in the nine months ended September 30, 2022 compared to the same period in the prior year. The decrease was primarily attributable to a one-time stock-based compensation expense incurred relating to the IPO in the prior year, offset by increases in: personnel-related costs, due to continued hiring over the period, office and facility-related costs, sales and marketing expenses as we focus on expanding our business by attending trade shows and conferences, and legal, accounting and other professional services as we expand our business processes and operational capabilities in line with our status as a public reporting company.

Gain on Loan Extinguishment

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	**2021**	**2022**	**% Change**	**2021**	**2022**	**% Change**
Gain on loan extinguishment	$ —	$ —	*	$ 4,183	$ —	*

** Percentage not meaningful*

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

Gain on loan extinguishment of $4.2 million for the nine months ended September 30, 2021 was driven by the forgiveness of the PPP loan by the lender.

Change in Fair Value of Warrants Liability

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	**2021**	**2022**	**% Change**	**2021**	**2022**	**% Change**
Change in fair value of warrants liability	$ —	$ —	*	$ (326,900)	$ —	*

** Percentage not meaningful*

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

Loss from the change in fair value of warrants liability of $326.9 million for the nine months ended September 30, 2021 was driven by the remeasurement of redeemable convertible preferred stock warrants at fair value immediately prior to their exercise dates during the period.

Interest Income

	Three Months Ended September 30,			Nine Months Ended September 30,		
(In thousands, except percentages)	**2021**	**2022**	**% Change**	**2021**	**2022**	**% Change**
Interest income	$ 452	$ 5,545	1,127 %	$ 1,123	$ 7,912	605 %

Three Months Ended September 30, 2022 Compared with the Same Period in 2021

Interest income increased by $5.1 million, or 1,127%, in the three months ended September 30, 2022 compared to the same period in the prior year. The increase was primarily attributable to interest income earned on money market funds and short-term investments.

Nine Months Ended September 30, 2022 Compared with the Same Period in 2021

Interest income increased by $6.8 million, or 605%, in the nine months ended September 30, 2022 compared to the same period in the prior year. The increase was primarily attributable to interest income earned on money market funds and short-term investments.

Key Metric and Non-GAAP Financial Measure

(*In thousands, except percentages*)	Three Months Ended September 30, 2021	Three Months Ended September 30, 2022	% Change	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2022	% Change
Loss from operations	$ (115,949)	$ (118,833)	2 %	$ (295,444)	$ (341,740)	16 %
Adjusted EBITDA[1]	$ (81,398)	$ (92,780)	14 %	$ (197,485)	$ (255,691)	29 %

[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 of directors 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. 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 net loss from operations determined in accordance with GAAP to non-GAAP adjusted EBITDA (in thousands):

	Three Months Ended September 30, 2021	Three Months Ended September 30, 2022	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2022
Loss from Operations	$ (115,949)	$ (118,833)	$ (295,444)	$ (341,740)
Stock-based compensation expense	32,082	23,032	90,880	75,710
Depreciation and amortization	2,359	2,874	6,768	8,335
Restructuring expenses	—	—	—	1,568
Interest expense	110	147	311	436
Adjusted EBITDA	$ (81,398)	$ (92,780)	$ (197,485)	$ (255,691)

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 September 30, 2022, our principal sources of liquidity were $0.9 billion of cash and cash equivalents, exclusive of restricted cash of $1.6 million, and $0.2 billion of short-term investments. 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. 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 semi-trucks and other products and services. 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):

	Nine Months Ended September 30,	
	2021	2022
Net cash (used in) provided by:		
Operating activities	$ (186,365)	$ (255,991)
Investing activities	$ (12,420)	$ (210,140)
Financing activities	$ 1,300,013	$ 1,941

Operating Activities

Net cash used in operating activities was $186.4 million and $256.0 million for the nine months ended September 30, 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 semi-truck technology, grow our research and development and general support personnel, and incur incremental expenses associated with being a public company.

Investing Activities

Net cash used in investing activities was $12.4 million and $210.1 million for the nine months ended September 30, 2021 and 2022, respectively. The increase was primarily due to our investment in marketable securities in the nine months ended September 30, 2022.

Additionally, non-cash acquisitions of property and equipment included in liabilities were $2.0 million and $3.8 million for the nine months ended September 30, 2021 and 2022, respectively.

Financing Activities

Net cash provided by financing activities was $1.3 billion for the nine months ended September 30, 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 $1.9 million for the nine months ended September 30, 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 loans.

Material Cash Requirements

At September 30, 2022, there were future minimum lease payments of $8.6 million and $60.2 million for finance and operating leases, respectively.

Critical Accounting Estimates

We prepare our condensed consolidated financial statements in accordance with GAAP. The preparation of these condensed 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 condensed 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.

There have been no material changes to our critical accounting policies and estimates as compared to the critical accounting policies and estimates discussed in our Annual Report on Form 10-K for the year ended December 31, 2021, except as described in Note 1. Description of Business and Summary of Significant Accounting Policies to our condensed consolidated financial statements.

JOBS Act Accounting Election

We are an emerging growth company ("EGC"), as defined in the Jumpstart Our Business Startups (JOBS) Act. The JOBS Act provides that an EGC can take advantage of an extended transition period for complying with new or revised accounting standards. This provision allows an emerging growth company to delay the adoption of some accounting standards until those standards would otherwise apply to private companies. We have elected to use the extended transition period under the JOBS Act for the adoption of certain accounting standards until the earlier of the date we (i) are no longer an EGC or (ii) affirmatively and irrevocably opt out of the extended transition period provided in the JOBS Act. As a result, our financial statements may not be comparable to companies that comply with new or revised accounting pronouncements as of public company effective dates.

Recent Accounting Pronouncements

For information on recently issued accounting pronouncements, refer to Note 1. Description of Business and Summary of Significant Accounting Policies in our condensed consolidated financial statements included elsewhere in this Quarterly Report on Form 10-Q.

Item 3. Quantitative and Qualitative Disclosures About Market Risk.

Other than the items noted below, there have been no material changes to the Company's market risk during the first nine months of 2022. For a discussion of the Company's exposure to market risk, refer to the Company's market risk disclosures set forth in Part II, Item 7A, "Quantitative and Qualitative Disclosures About Market Risk" of the 2021 Form 10-K.

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 $0.9 billion and short-term investments of $0.2 billion as of September 30, 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 September 30, 2022.

Item 4. Controls and Procedures.

Evaluation of Disclosure Controls and Procedures

Our disclosure controls and procedures are designed to ensure that information we are required to disclose in reports that we file or submit under the Securities Exchange Act of 1934, as amended (the "Exchange Act") is recorded, processed, summarized, and reported within the time periods specified in the SEC rules and forms, and that such information is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, as appropriate, to allow timely decisions regarding required disclosure.

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 Quarterly Report on Form 10-Q. 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 weakness in our internal control over financial reporting described below. In light of this fact, our management has performed additional analyses, investigations, and other post-closing procedures and has concluded that, notwithstanding the material weakness in our internal control over financial reporting, the condensed consolidated financial statements for the periods covered by and included in this Quarterly Report on Form 10-Q fairly present, in all material respects, our financial position, results of operations and cash flows for the periods presented in conformity with GAAP.

Material Weakness in Internal Control over Financial Reporting

In connection with our evaluation for the three months ended September 30, 2022, we identified a material weakness in internal control over financial reporting resulting from 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, we did not maintain effective controls over the 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 September 30, 2022.

Remediation Plan

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

- Providing targeted training to certain personnel regarding the scope and application of the Company's policy on identification and reporting of related party transactions;
- 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 this material weakness, 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 quarter ended September 30, 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.

PART II—OTHER INFORMATION

Item 1. 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. 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 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: *Woldanski v. TuSimple Holdings, Inc., et al.*, 3:23-cv-00282-JES-MSB (S. D. Cal.).

The complaints in the August 2022 Action and November 2022 Action may be amended at a future date to add additional or alternate allegations regarding liability or alternate or additional claims for relief.

On May 3, 2023, the Company made a motion to consolidate the August 2022 Action and November 2022 Action. That motion remains pending.

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.

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.

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 Quarterly Report on Form 10-Q, including the section titled "Management's Discussion and Analysis of Financial Condition and Results of Operations" and our unaudited condensed consolidated financial statements and the accompanying notes, included elsewhere in this Quarterly Report on Form 10-Q. 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 exploration of strategic alternatives and 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.
- 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, technical engineers, and certain key employees, and the loss of any executive officer or key employee, or the inability to identify and recruit executive officers, technical engineers, and key employees in a timely manner, 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 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, a material weakness 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, termination of contracts with certain of our OEM or Tier 1 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, 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. 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 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 and 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 Quarterly Report on Form 10-Q, we were unable to file this report, as well as our Quarterly Report on Form 10-Q for the quarter ended March 31, 2023, and Annual Report on Form 10-K for the year ended December 31, 2022 with the SEC on a timely basis, and we foresee being unable to timely file our Quarterly Report on Form 10-Q for the quarter ended June 30, 2023 (together, the "Delayed Reports").

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 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 by September 30, 2023. 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 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 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 exposes 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. We expect to derive the majority of our revenue from our AFN, which is still in the early stages of development and commercialization. While 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, we still continue to be in the early stages of commercialization of our L4 autonomous truck. 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 AFN and our other 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, 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 the vehicle. We cooperated with the investigation and it 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 revenue 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 have 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 $1.5 billion as of September 30, 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 the rate at which we will incur losses to be significantly higher 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, and 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 of directors 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, technical engineers, and certain key employees, and the loss of any executive officer or key employee, or the inability to identify and recruit executive officers, technical engineers, and key employees in a timely manner, could harm our business, operating results, and financial condition.

Our success depends largely upon the continued services of our key executive officers and certain key employees. We rely on our executive officers and key 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. For example, and 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.

In addition, recent changes to our board of directors and senior management, unfavorable publicity or perceptions about our succession planning could adversely impact our ability to attract and retain highly 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 or key employees could have an adverse effect on our business.

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.

Our workforce was recently reduced, which could impact the speed of our business development and our ability to retain and attract talent.

As previously disclosed, 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.

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. We have, from time to time, experienced, and we expect to continue to experience, difficulty in hiring and retaining employees with appropriate qualifications. 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. In addition, as previously disclosed, prior to his resignation, we were in the process of conducting an internal investigation into claims that Dr. Xiaodi Hou was approaching TuSimple employees about leaving the Company and joining a new venture being planned by Dr. Hou. Dr. Hou resigned while the investigation was ongoing.

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.

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, 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.

For example and 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. Failure to manage our strategy effectively could cause our business to suffer, which, in turn, could have an adverse impact on our financial condition and operating results.

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 AFN 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 of directors 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 a material weakness 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 a material weakness. 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 is not related to the intangible assets or patents reflected on our balance sheet. 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. The Audit Committee's investigation revealed that that 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. Based upon the above findings, management has concluded that a material weakness exists in its disclosure controls and procedures regarding related party transactions in its SEC filings.

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 4 of Part I of this Quarterly Report on Form 10-Q, 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, this material weakness 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.

The COVID-19 pandemic caused us to modify our business practices (such as employee travel plans and cancellation of physical participation in meetings, events, and conference).

We are also vulnerable to 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 "We have identified and may in the future identify a material weakness in our internal control over financial reporting."

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. For example, the Leahy-Smith America Invents Act (the "AIA") enacted in September 2011, resulted in significant changes in patent legislation. An important change introduced by the AIA is that, as of March 16, 2013, the United States transitioned from a "first-to-invent" to a "first-to-file" system for deciding which party should be granted a patent when two or more patent applications are filed by different parties claiming the same invention. Under a "first-to-file" system, assuming the other requirements for patentability are met, the first inventor to file a patent application generally will be entitled to a patent on the invention regardless of whether another inventor had made the invention earlier. A third party that files a patent application in the USPTO after that date but before us could therefore be awarded a patent covering an invention of ours even if we made the invention before it was made by the third party. Circumstances could prevent us from promptly filing patent applications on our inventions.

The AIA also includes a number of significant changes that affect the way patent applications will be prosecuted and also may affect patent litigation. These include allowing third party submission of prior art to the USPTO during patent prosecution and additional procedures to attack the validity of a patent by USPTO administered post-grant proceedings, including post-grant review, *inter partes* review, and derivation proceedings. Because of a lower evidentiary standard in USPTO proceedings compared to the evidentiary standard in United States federal courts necessary to invalidate a patent claim, a third party could potentially provide evidence in a USPTO proceeding sufficient for the USPTO to hold a claim invalid even though the same evidence would be insufficient to invalidate the claim if first presented in a district court action. Accordingly, a third party may attempt to use the USPTO procedures to invalidate our patent claims that would not have been invalidated if first challenged by the third party as a defendant in a district court action. The AIA and its implementation could increase the uncertainties and costs surrounding the prosecution of our patent applications and the enforcement or defense of our issued patents, all of which could have a material adverse effect on our business, financial condition, results of operations, and prospects.

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 “We have identified and may in the future identify a material weakness in our internal control over financial reporting.”

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. 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 its compliance with the NSA as it relates to information shared by TuSimple US with TuSimple China, Hydron and Hydron' 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 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.

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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.

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.

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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. 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 United States 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:

- 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;
- United States 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.

Many of the components that we require 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 United States, economic sanctions on individuals, corporations or countries, and other government regulations affecting trade between the United States and other countries. A number of other nations have proposed or instituted similar measures directed at trade with the United States 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.

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.

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, seek to offer our services, or conduct our business, 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 United States, economic sanctions on individuals, corporations or countries, and other government regulations affecting trade between the United States and other countries. A number of other nations have proposed or instituted similar measures directed at trade with the United States in response. As a result of these developments, there may be greater restrictions and economic disincentives on international trade that could adversely affect our business. 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 United States. 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 has 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 the Committee, 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"). 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 the board of directors of the Company 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 of directors, which included all members of the Government Security Committee the Company's board of directors (“GSC”), were removed from the board of directors. 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. 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.

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. As disclosed in our Current Report on Form 8-K, filed with the SEC on November 16, 2022, as a result of a proxy and voting agreement between our Founders, Mr. Chen holds, as of July 2023, approximately 58% of the voting power of the outstanding common stock. On November 10, 2022, pursuant to a written consent, the Founders consented to the removal of four members of our board of directors. 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 will continue to control a majority of the combined voting power of our common stock and therefore be able to control all matters submitted to our stockholders for approval, and has and may again in the future remove some or all of the members of our board of directors, 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 our Annual Report on Form 10-K for the fiscal year ended December 31, 2021.

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 with the SEC on November 16, 2022, Mr. Chen beneficially owns, as of July 2023, approximately 58% of the voting power of the outstanding common stock. As a result, we are a "controlled company" under the Nasdaq Listing Rules. Under these 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 Quarterly Report on Form 10-Q, 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 of directors has complete discretion as to whether to distribute dividends. Even if our board of directors 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 of directors. 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 of directors, or on committees of our board of directors, 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 Section 404(a) and Section 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, a material weakness 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") complaint 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. 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”) complaint 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 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, Inc. ("Hydron") and our sharing of confidential information and proprietary technology with Hydron without approval from our board of directors. 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 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.).

The complaints in the August 2022 Action and November 2022 Action may be amended at a future date to add additional or alternate allegations regarding liability or alternate or additional claims for relief.

On May 3, 2023, we made a motion to consolidate the August 2022 Action and November 2022 Action. That motion remains pending. 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 “Subsequent Events” in the notes to our consolidated financial statements.

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 of directors 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 of directors 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 DGCL, 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 or a decrease in our distributions to stockholders that lead purchasers of shares of our common stock to demand a higher yield;
- 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 2. Unregistered Sales of Equity Securities and Use of Proceeds.

Use of Proceeds

The Registration Statement on Form S-1 (File No. 333-254616) for our initial public offering (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.

Purchases of Equity Securities by the Issuer and Affiliated Purchasers

None.

Item 6. 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	
10.1	Form of Separation Agreement between TuSimple Holdings Inc. and James Mullen.	8-K	001-40326	10.1	9/06/2022	
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 Quarterly Report on Form 10-Q 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 Quarterly Report on Form 10-Q, irrespective of any general incorporation language contained in such filing.

SIGNATURES

Pursuant to the requirements of 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.

Date: July 17, 2023	By:	/s/ Cheng Lu
		Cheng Lu
		Chief Executive Officer
		(*Principal Executive Officer)*
Date: July 17, 2023	By:	/s/ Eric Tapia
		Eric Tapia
		Chief Financial Officer
		(*Principal Financial Officer)*

Exhibit 31.1

**CERTIFICATION 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**

I, Cheng Lu, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of TuSimple Holdings Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Paragraph omitted pursuant to Exchange Act Rules 13a-14(a) and 15d-15(a);

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: July 17, 2023

By: /s/ Cheng Lu
Cheng Lu
Chief Executive Officer
(*Principal Executive Officer)*

Exhibit 31.2

CERTIFICATION 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

I, Eric Tapia, certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of TuSimple Holdings Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) for the registrant and have:

   (a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   (b) Paragraph omitted pursuant to Exchange Act Rules 13a-14(a) and 15d-15(a);

   (c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   (d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   (a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   (b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: July 17, 2023

By: /s/ Eric Tapia

Eric Tapia
Chief Financial Officer
(Principal Financial Officer)

Exhibit 32.1

CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Cheng Lu, Chief Executive Officer of TuSimple Holdings Inc. (the "Company"), do hereby certify, to the best of my knowledge and pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Quarterly Report on Form 10-Q of the Company for the period ended September 30, 2022 (the "Report"), fully complies with the requirements of sections 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: July 17, 2023	By:	/s/ Cheng Lu
		Cheng Lu
		Chief Executive Officer (*Principal Executive Officer)*

Exhibit 32.2

**CERTIFICATION PURSUANT TO
18 U.S.C. SECTION 1350, AS ADOPTED PURSUANT TO
SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002**

I, Eric Tapia, Chief Financial Officer of TuSimple Holdings Inc. (the "Company"), do hereby certify, to the best of my knowledge and pursuant to 18 U.S.C. § 1350, as adopted pursuant to § 906 of the Sarbanes-Oxley Act of 2002, that:

(1) The Quarterly Report on Form 10-Q of the Company for the period ended September 30, 2022 (the "Report"), fully complies with the requirements of section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

(2) The information contained in the Report fairly presents, in all material respects, the financial condition and results of operations of the Company.

Date: July 17, 2023	By:	/s/ Eric Tapia
		Eric Tapia
		Chief Financial Officer
		(*Principal Financial Officer)*