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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF NEW YORK

LORRAINE A. ARTERY, Individually and on
behalf of all others similarly situated,

Plaintiff,

v.

ASTRA SPACE INC. F/K/A HOLICITY INC.,
CHRIS C. KEMP, KELYN BRANNON, and
STEVEN EDNIE,

Defendants.

Case No.

CLASS ACTION COMPLAINT FOR
VIOLATION OF THE FEDERAL SECURITIES
LAWS

JURY TRIAL DEMANDED

CLASS ACTION

Plaintiff Lorraine A. Artery (“Plaintiff”), individually and on behalf of all other persons similarly situated, by Plaintiff’s undersigned attorneys, for Plaintiff’s complaint against Defendants (defined below), alleges the following based upon personal knowledge as to Plaintiff and Plaintiff’s own acts, and information and belief as to all other matters, based upon, *inter alia*, the investigation conducted by and through Plaintiff’s attorneys, which included, among other things, a review of the defendants’ public documents, conference calls and announcements made by defendants, United States Securities and Exchange Commission (“SEC”) filings, wire and press releases published by and regarding Astra Space Inc. f/k/a Holicity Inc. (“Astra” or the

“Company”), analysts’ reports and advisories about the Company, and other information readily obtainable on the Internet. Plaintiff believes that substantial evidentiary support will exist for the allegations set forth herein after a reasonable opportunity for discovery.

NATURE OF THE ACTION

1. This is a federal securities class action on behalf of a class consisting of all persons and entities other than Defendants who purchased or otherwise acquired the publicly traded securities of the Company between February 2, 2021 and December 29, 2021, both dates inclusive (the “Class Period”). Plaintiff seeks to recover compensable damages caused by Defendants’ violations of the federal securities laws and to pursue remedies under Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 (the “Exchange Act”) and Rule 10b-5 promulgated thereunder.

JURISDICTION AND VENUE

2. The claims asserted herein arise under and pursuant to §§10(b) and 20(a) of the Exchange Act (15 U.S.C. §§78j(b) and §78t(a)) and Rule 10b-5 promulgated thereunder by the SEC (17 C.F.R. §240.10b-5).

3. This Court has jurisdiction over the subject matter of this action under 28 U.S.C. §1331 and §27 of the Exchange Act.

4. This Court has jurisdiction over each defendant named herein because each defendant has sufficient minimum contacts with this judicial district so as to render the exercise of jurisdiction by this Court permissible under traditional notions of fair play and substantial justice.

5. Venue is proper in this judicial district pursuant to §27 of the Exchange Act (15 U.S.C. §78aa) and 28 U.S.C. §1391(b) as the alleged misstatements entered and subsequent damages took place within this judicial district.

6. In connection with the acts, conduct and other wrongs alleged in this Complaint, Defendants, directly or indirectly, used the means and instrumentalities of interstate commerce, including but not limited to, the United States mail, interstate telephone communications and the facilities of the national securities exchange.

PARTIES

7. Plaintiff, as set forth in the accompanying Certification, purchased the Company's securities at artificially inflated prices during the Class Period and was economically damaged thereby.

8. Defendant Astra purportedly operates as an operational space launch company. On June 30, 2021 Astra Space Inc. and Holicity Inc. ("Holicity"), a special purpose acquisition company ("SPAC"), merged.

9. The Company is incorporated in Delaware with its headquarters at 1900 Skyhawk Street, Alameda, California. Shares of the Company have been listed on the NASDAQ under the ticker symbol "ASTR" since July 1, 2021. Prior to the merger, the Company's ordinary shares traded on the NASDAQ under the ticker symbol "HOL."

10. Defendant Chris C. Kemp ("Kemp") is and was at all pertinent times the founder, Chief Executive Officer ("CEO"), and Chairman of Astra Space, Inc. Since the merger, Defendant Kemp has served in the same capacities for the Company.

11. Defendant Kelyn Brannon (“Brannon”) is and was at all pertinent times the Chief Financial Officer (“CFO”) of Astra Space, Inc. Since the merger, Defendant Brannon has served in the same capacity for the Company.

12. Defendant Steven Ednie (“Ednie”) was the Company’s Chief Financial Officer (“CFO”) and secretary prior to the merger.

13. Defendants Kemp, Brannon, and Ednie are sometimes referred to herein as the “Individual Defendants.”

14. Each of the Individual Defendants:

- (a) directly participated in the management of the Company;
- (b) was directly involved in the day-to-day operations of the Company at the highest levels;
- (c) was privy to confidential proprietary information concerning the Company and its business and operations;
- (d) was directly or indirectly involved in drafting, producing, reviewing, and/or disseminating the false and misleading statements and information alleged herein;
- (e) was directly or indirectly involved in the oversight or implementation of the Company’s internal controls;
- (f) was aware of or recklessly disregarded the fact that the false and misleading statements were being issued concerning the Company; and/or
- (g) approved or ratified these statements in violation of the federal securities laws.

15. The Company is liable for the acts of the Individual Defendants and its employees under the doctrine of *respondeat superior* and common law principles of agency because all of the wrongful acts complained of herein were carried out within the scope of their employment.

16. The scienter of the Individual Defendants and other employees and agents of the Company is similarly imputed to the Company under *respondeat superior* and agency principles.

17. The Company and the Individual Defendants are referred to herein as the “Defendants.”

SUBSTANTIVE ALLEGATIONS

Materially False and Misleading Statements

18. On February 2, 2021, the Company filed with the SEC a Form 8-K (the “February 2, 2021 8-K”) signed by Defendant Ednie which attached a press release dated February 2, 2021 entitled “Astra to become the first publicly traded space launch company on NASDAQ via merger with Holicity” which announced the merger between Astra (the “Merger Announcement Press Release”). The Merger Announcement Press Release stated the following, in pertinent part, regarding Astra Space Inc.: ““This transaction takes us a step closer to our mission of improving life on Earth from space *by fully funding our plan to provide daily access to low Earth orbit from anywhere on the planet,*” said Chris Kemp, Founder, Chairman and CEO of Astra.” (Emphasis added.)

19. The February 2, 2021 8-K also attached an investor presentation (the “Investor Presentation”) which included the following slides touting Astra Space Inc.’s ability to “Launch anywhere in the world in 24 hours”, its timeline, and its potential market.



MASS-PRODUCED PORTABLE LAUNCH SYSTEM

RAPID
From payload delivery to launch within days

PORTABLE AND GLOBAL
Launch from anywhere in the world in 24 hours

AFFORDABLE
Most affordable launch system for small payloads

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SUPPLY CONSTRAINED MARKET LEADING TO A RAPIDLY GROWING PIPELINE

\$1.2B Pipeline

with great diversity in number of customers and verticals

 BROADBAND	 EARTH OBSERVATION
 MARITIME	 POINT-TO-POINT
 IOT/M2M CONNECTIVITY	 GOVERNMENT

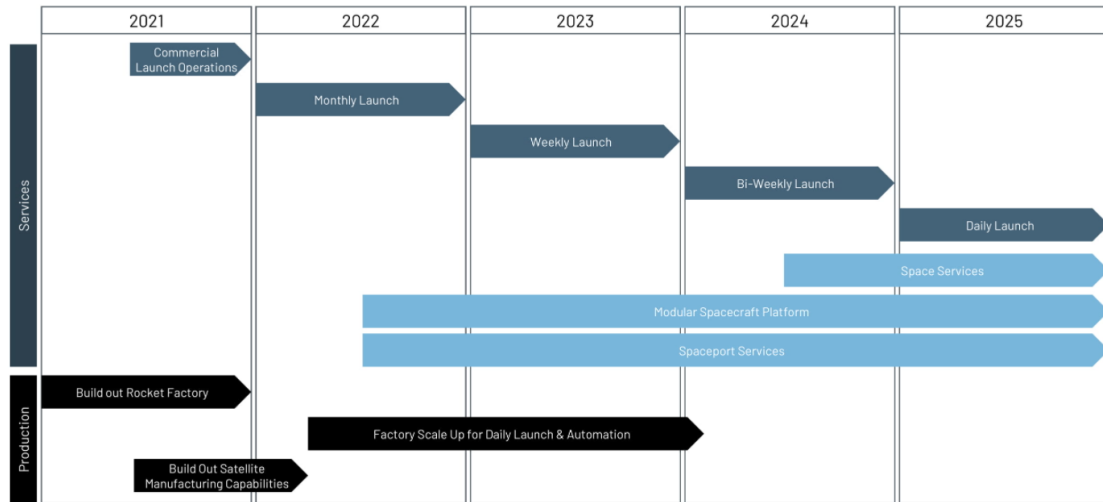
Ongoing demand to be driven by deployment and maintenance of mega-constellations

Source: Company estimates.

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TIMELINE TO HYPERSCALE SPACE OPERATIONS



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ASTRA IS AN ATTRACTIVE OPPORTUNITY FOR PUBLIC INVESTORS TO PARTICIPATE IN THE COMMERCIAL SPACE ECONOMY

- Creates the first and only Public Hyperscale Space Platform
- Only potential provider of daily, low-cost and global access to Space
- Uniquely positioned offering with unmatched value proposition to mega-constellations
- Proven technology that is far along the development curve; the third privately funded U.S. company to achieve orbital launch capabilities
- Strong commercial traction with over \$1.2B in pipeline opportunities
- ESG friendly given climate-focused end-use applications and environment-conscious manufacturing choices
- World-class management team with unparalleled industry experience at NASA and SpaceX

As the only publicly-traded satellite launch company, Astra represents a pure-play opportunity to partake in the momentum of tomorrow's Space Economy

- \$1.0+ TRILLION**
Space Economy in 2040⁽¹⁾
- > 38K**
Satellites to be launched 2020-2029⁽²⁾
- \$40.7 BILLION**
Government Investment in Space⁽³⁾
- \$1.2+ BILLION**
Pipeline
- \$46 BILLION**
Valuation for SpaceX today, representing ~48% CAGR since reaching Orbit in 2009⁽⁴⁾

Source: Wall Street Research.
 (1) PwC Morgan Stanley Research.
 (2) Factors in European Space and Management estimates for current launches.
 (3) Based on projected FY21 DoD and NASA budgets from Jefferies, What's Up in Space: Now Launching, 2021. [https://www.jefferson.com/insights/whats-up-in-space-now-launching-2021](#)
 (4) Based on \$4.0B 2008 valuation per Pitchbook.

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ASTRA MEETS THE NEEDS OF TODAY'S CONSTELLATIONS

Astra's dedicated direct orbital delivery eliminates the need for an orbit raise or in-space shuttling saving customers time and reducing risk of delay

ASTRA

- RAPID**
Real-Time, Point-to-Point Satellite Delivery
- GLOBAL**
From Anywhere on Earth
- AFFORDABLE**
Launch Vehicle Optimized for Cost

IDEAL FOR KEY USE CASES

- TEST SATELLITE LAUNCHES
- SYSTEM DEPLOYMENT
- GAP FILLING⁽¹⁾
- REPLENISHMENT

(1) Gap filling represents launching satellites to fill out an orbital plane that already has a number of operational satellites.

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20. On June 7, 2021, the Company issued a press release entitled “Astra Acquires Apollo Fusion to Reach New Orbits” which stated the following, in pertinent part, regarding the Apollo acquisition and its effects on the Company:

Astra, the fastest privately funded company in history to reach space, announced today its planned acquisition of Apollo Fusion in a transaction valued up to \$145 million. *Apollo Fusion manufactures a leading electric propulsion engine. This acquisition allows Astra to provide launch and space services beyond low Earth orbit (LEO), to medium Earth orbit, geosynchronous, and lunar orbits.*

“In addition to increasing Astra’s total addressable market for launch services, the acquisition of Apollo Fusion accelerates Astra’s ability to efficiently deliver and operate spacecraft beyond low Earth orbit,” said Astra Founder, Chairman, and CEO Chris Kemp.

* * *

“Propulsion systems open new destinations,” said Apollo Fusion Founder and CEO Mike Cassidy. “Our team is excited to combine the flexibility of in-space propulsion with the world’s most responsive launch provider.”

(Emphasis added.)

21. On October 22, 2021, the Company filed with the SEC an amended quarterly report for the period ended June 30, 2021 (the “Amendment”) signed by Defendants Kemp and Brannon. Attached to the Amendment were certifications pursuant to the Sarbanes-Oxley Act of 2002 (“SOX”) signed by Defendants Kemp and Brannon attesting to the accuracy of financial reporting, the disclosure of any material changes to the Company’s internal control over financial reporting and the disclosure of all fraud.

22. The Amendment stated the following, in pertinent part, regarding the Company’s ability to launch “anywhere”, its addressable market, and its diversification and broadband constellation plan:

Our system consists of a small launch vehicle and mobile ground infrastructure that can fit inside standard shipping containers for rapid deployment anywhere in the world. ***Our rocket requires a launch site with little more than a concrete pad and only six Astra employees on-site***, leveraging our highly automated launch operations, and our production system is designed to scale efficiently to ***hundreds of launches per year***. ***Our rocket’s payload capacity is tailored for the needs of modern LEO satellite constellations***, allowing precise and rapid placement of individual satellites into their required orbits. We believe this makes Astra’s system more responsive and affordable than other launch alternatives, ***for thousands of LEO satellites planned in the coming decade***.

(Emphasis added.)

23. On November 11, 2021, during the Company’s third quarter earnings call, when asked about a relationship with Firefly Aerospace Inc., Defendant Kemp stated the following, in pertinent part, regarding and dismissing the issue:

So then finally, the question on the supplier. I think there were some articles online speculating a supplier. And I think I've discussed before, we don't discuss how we manufacture things or our suppliers publicly. But what I can tell you, and I will reiterate here, is that all intellectual property required to produce all of our technology will be owned, licensed or developed by Astra. And anything you've read is not inconsistent with this strategy. So I think that's all I can say about that at this point.

(Emphasis added.)

24. On November 15, 2021, the Company filed with the SEC its quarterly report for the period ended September 30, 2021 (the “3Q21 Report”) signed by Defendants Kemp and Brannon. Attached to the 3Q21 Report were certifications pursuant to SOX signed by Defendants Kemp and Brannon attesting to the accuracy of financial reporting, the disclosure of any material changes to the Company’s internal control over financial reporting and the disclosure of all fraud.

25. The 3Q21 Report stated the following, in pertinent part, regarding the Company’s ability to launch “anywhere”, its addressable market, and its diversification and broadband constellation plan:

Our system consists of a small launch vehicle and mobile ground infrastructure that can fit inside standard shipping containers for rapid deployment anywhere in the world. Our rocket requires a launch site with little more than a concrete pad and only six Astra employees on-site, leveraging our highly automated launch operations, and our production system is designed to scale efficiently to hundreds of launches per year. Our rocket’s payload capacity is tailored for the needs of modern LEO satellite constellations, allowing precise and rapid placement of individual satellites into their required orbits. We believe this makes Astra’s system more responsive and affordable than other launch alternatives, *for thousands of LEO satellites planned in the coming decade.*

... On November 4, 2021, we announced the filing of an application with the Federal Communications Commission for V-band spectrum access, which, if approved, would allow us to offer a satellite constellation in the future.

* * *

On November 4, 2021, we filed an application with the Federal Communication Commission, under which we requested authority to launch and operate a non-geostationary orbit satellite system using *V-band frequencies (the "Constellation") as we work to build out our Space Services offering to enable communications.*

* * *

Lowering Manufacturing Costs and Increasing Payloads

... We plan to increase the maximum payload capability of our rockets from approximately 50 kg for our first commercial flight to up to 500 kg for a mid-

inclination 500 km orbit, which we believe will make Astra a compelling option for low Earth orbit constellation deployment and replenishment. Our affordable manufacturing processes use normally readily available materials and are highly scalable, while we believe our ongoing improvements in design and manufacturing will further reduce our per rocket manufacturing costs.

* * *

Acquisition of Apollo Fusion

On July 1, 2021, the Company completed its acquisition of Apollo Fusion, Inc. (“Apollo”), a designer and builder of thruster propulsion systems for satellite programs.

(Emphasis added.)

26. The statements referenced in ¶¶18-25 above were materially false and/or misleading because they misrepresented and failed to disclose the following adverse facts pertaining to the Company’s business which were known to Defendants or recklessly disregarded by them. Specifically, Defendants made false and/or misleading statements and/or failed to disclose that: (1) Astra cannot launch “anywhere”; (2) Astra significantly overstated its addressable market; (3) Astra overstated the effectiveness of its designs and reliability; (4) Astra significantly overstated its plans for diversification and its broadband constellation plan; and (5) as a result, Defendants’ public statements were materially false and/or misleading at all relevant times.

The Truth Emerges

27. On December 29, 2021, during market hours, market researcher Kerrisdale Capital released a report entitled “Astra Space, Inc (ASTR): Headed for Dis-Astra” (the “Report”) which alleged myriad issues with the Company.

28. The Report stated the following regarding the Company’s claims that it can launch anywhere:

Management habitually describes Astra as having the flexibility to launch from “anywhere in the world,” which is simply not true. Just because a rocket can be transported in a shipping container – doesn’t mean one can lift off from any Walmart parking lot. **In the US, Astra can only launch from an FAA-licensed commercial spaceport approved for vertical launch. There are only 5 such sites (plus SpaceX’s private Boca Chica spaceport) located in the U.S.** 97% of launches over the last 40 years have been from only 2 launch sites: Cape Canaveral spaceport (30 launches in 2020) and Vandenberg Space Force Base (1 launch in 2020). **For a company aiming to launch hundreds of rockets per year, the reliance on a small handful of key spaceports is a bottleneck that threatens its whole business model.** While there are ongoing modernization efforts at Cape Canaveral and the FAA is streamlining launch licensing requirements, these efforts can get bogged down in bureaucratic quagmires.

Due to the fact vertical launch vehicles drop one or more stages downrange, creating a hazard to life and property in the drop zones, vertical launches must take place near bodies of water (like Cape Canaveral) or in remote locations (Spaceport America, adjacent to White Sands Missile range in New Mexico).

* * *

Perhaps in recognition of the challenge in finding sufficient domestic spaceport access, the company has described working hard to secure launch sites internationally. International space agencies, trade groups, and regulatory bodies are working on various fronts to improve spaceport availability, but these efforts generally lag that of the US and have encountered their own challenges from local politicians and environmentalists. **How and if a US company with a US rocket would be granted approval – when many countries typically assign preference to supporting their own member nation launch programs – is also uncertain.** With so much focus on scaling manufacturing processes and launch cadence, the seemingly mundane issue of finding somewhere to launch is a risk to Astra’s long-term vision because contrary to management’s oft repeated claim – **Astra can’t launch from anywhere.**

(Emphasis added.)

29. The Report states the following, in pertinent part, regarding the Company’s addressable market:

Astra’s investor pitch boils down to selling the pipedream of an unprecedented number of cheap rocket launches. **Astra’s forecast calls for 300 launches per year by 2025, a whopping 10x more than SpaceX achieved in 2021. Management markets this exceptionally aspirational goal (which we view as pure fantasy) in a bid to spread its expensive Bay Area manufacturing costs over enough rockets in order to turn a profit.** A reality check is in order: To date,

Astra has managed just one successful orbital test flight. *If Astra’s five-year projection of almost daily successful launches of rockets made with non-aerospace grade parts does not sound improbable enough, it ignores an even graver problem with Astra’s projection – not one expert whom we interviewed, nor any independent market study we reviewed, offered any reason to think that, industry-wide, sufficient market demand will exist for Astra to sustain approximately daily launches by 2035, let alone 2025.*

* * *

Financial Projections Rely on Absurd Market Assumptions

Astra’s financial forecasts rely on launching an astounding 165 rockets by 2024 and 300 rockets by 2025. *To put these figures in context, 300 launches is 10x the total number of US commercial launches in 2022. 300 is nearly triple the total number of launches conducted globally in 2020.* Incredibly, despite the obvious engineering, manufacturing, logistical, and regulatory challenges hitting such a cadence would represent, Astra felt it appropriate to issue this outlook before successfully reaching orbit even once.

Planned Daily Launch Cadence Far Exceeds Addressable Market

... Astra touted big picture themes like “\$1 trillion+ Total Space Economy in 2040” (from Morgan Stanley), and a misleading slide that shows a large increase in the cumulative number of satellites to be launched in the coming years, but without specifying Astra’s niche role in this economy and the true addressability for a rocket with only a 500kg payload capability (eventually). It’s a significant red flag with a simple explanation: every legitimate market study that Astra could include would only show its projections to be laughably unrealistic – so Astra just left them out.

* * *

Below we walk through an analysis to determine a more refined view of the market opportunity for Astra as it strives to establish daily launch in 2025. We begin with NSR’s estimate of the total number of non-GEO satellites to be launched in 2025 (2,255). We then apply two simple filters: 1) we exclude 90% or 851 of NSR’s North American communications satellites forecast to account for Starlink (SpaceX launched 850 Starlink satellites in 2020), 2) we deduct 90% of satellites from Asia and 20% from Europe based on the contribution to these regions from Chinese and Russian satellites.

Astra 2025E Launch TAM	
	<u>2025E</u>
Total Non-GEO Satellite Launches	2,255
Less: NA Communications	(851)
Less: 90% Asia (China)	(792)
Less: 20% of Europe (Russia)	(25)
Total Addressable Non-GEO Satellites	587

Source: Kerrisdale analysis and Northern Sky Research, Global Satellite Manufacturing and Launch Markets 11th Edition, July 2021.

At less than 600 satellites, the entire non-captive TAM for launch is easily supported by less than 100 total launches. SpaceX rideshare recently set a record for 134 satellites on a single mission. ***Juxtapose a potential addressable market of less than 100 launches in aggregate, with Astra’s projection of conducting 300 launches themselves when there are dozens of competitors, and one can see why our conversations with a range of industry participants yielded the following comments regarding Astra’s plans:***

“I laugh at that number...There’s no way they are doing 300 launches by 2025; by 2035 it would still be a stretch.”

— Senior Engineer, launch broker

“We are, all around in the industry, in the same spot. Even within Astra and at [our small launch company], I’m looking at [1/10th Astra’s number] rockets, and we are freaking out – are we really going to have enough customers for this?”

— Senior Engineer, small launch provider

“Happy they got to orbit on last launch a few weeks ago, that’s great, but there’s just a lot of issues with their rocket and their business model...claims of launching every day? It’s pretty exciting when a launch provider can launch once a month – and sure, everyone would love for rockets to be like airplanes – that’s not going to happen for at least another decade. So yes, I have some serious concerns about Astra’s claims.”

— Mission Manager for a broadband mega-constellation

... We believe there will always be some level of interest in a service that can regularly/flexibly bring a handful of smallsats to a specific orbital location, even at a premium price to rideshares – but that is a niche offering in a highly competitive field. ***It is not an addressable market that comes anywhere near supporting 300 launches per year for a single company with Astra’s limited capabilities.***

* * *

This is because ***while satellite volumes are increasing, launch pricing is under constant deflationary pressure*** (the latter is enabling the former).

Competition from new entrants and from larger rideshare players lowering price, cost efficiencies from reusable launchers, and improvements in technology and operations all conspire to exert downward pressure on price. Taken together, we estimate a total launch market value that averages ~\$13bn per year over the next several years, with a whopping 85% accounted for in constellations, where larger launch vehicles enjoy economies of scale, leaving an annual TAM for a small launcher like Astra in the \$~2 billion dollar range.

Astra’s 2025E launch revenue forecast of \$1.125bn assumes it can hold ASP constant at \$3.75m and rise in 4 years to become the dominant player in the small launch market. Either NSR is too pessimistic (which anyone who has followed the industry knows is not usually how industry projections work) or, as we would contend, the projections of a new space SPAC, announced at the height of the bubble (two days before Virgin Galactic hit its all-time high of \$62) is complete fantasy.

Without High Launch Cadence, Astra’s Business Model Falls Apart

... The problem lies in the unit economics of launch....

* * *

Investors should be asking whether Astra devised a launch cadence to meet market demand or to merely solve for the inherent weaknesses in its business model? Our research, supported by a range of interviews with key industry players, point strongly to the latter. ***Astra took full advantage of the lack of scrutiny SPACs enjoyed earlier this year relative to traditional IPOs, passed off a launch cadence without any supporting market demand,*** and sold equity in a bubble that has now burst. As a launch services broker with direct insight into market trends on a global basis described, “we get it, it was a cash grab...but how are you not going to squander all this money? Astra is all show and it’s not clear where they’re going to go aside from just building a bunch of stuff.”

(Emphasis added.)

30. The Report stated the following, in pertinent part, regarding the Company's designs:

Its main competitors will soon be launching larger 1,000kg+ payload rockets while Astra has yet to overcome developmental hurdles necessary to successfully launch even a single satellite into any of the emerging broadband mega-constellations. Shortly after Astra announced its SPAC merger, the company increased its payload capacity goal (not a trivial matter in rocket programs) and signed a "secret" deal with a competitor for access to some of the competitor's more powerful engine IP – both clear signs that Astra is struggling to keep pace with market leaders. Moreover, Astra shortsightedly relies on cheap, off-the-shelf commercial parts – a strategy that precludes it from exploiting the economic advantages that its more sophisticated competitors enjoy by developing reusable rockets that in the long run reduce expenses. Consequently, Astra remains strikingly vulnerable to the relentless price deflation that characterizes today's launch market.

* * *

Undersized and Not Reusable: Astra is Falling Behind Industry Trends

* * *

Not only is the overall addressable market Astra has promoted vastly overstated – Astra's development path is on the wrong side of key trends within the industry: larger payloads and reusability.

Most of the increase in mass-to-orbit in the coming decade will be as part of large broadband constellations. According to NSR, nearly 80% of all non-GEO satellites from now until the end of the decade will be part of constellations of communications smallsats. Smallsat manufacturers are taking advantage of declining launch costs to build larger, more sophisticated constellations of satellites which generally have more mass than previous iterations.

* * *

Now examine Astra's development path and some of the changes it has announced only months into being a public company. At the time of the SPAC announcement 10 months ago, Astra's stated goal was a 300kg payload to 500km Sun-Synchronous Orbit by 2023. By 2025, it hoped a vehicle that can "throw about 300 kilograms to a reference orbit" would be launched daily. Only 3 months later however, in conjunction with the Planet launch agreement, Astra announced a new goal: 500kg to 500km LEO. Why the sudden change? Because according to experts in the industry, management likely knew that to make good on claims that

Astra could “meet the needs of all these mega-constellations like Kuiper”, it needed a rocket with more than just a 300kg payload.

Announcing a 66% jump in payload capacity is not a trivial matter in rocket development. It involves meaningful redesign work with new components and a more powerful engine – one that apparently Astra did not have. As a sign of Astra’s unpreparedness, four months after the new 500kg objective, **Astra signed a “secret” deal to purchase the IP for an engine powerful enough to launch this new 500kg payload from its competitor**, Firefly Aerospace (more on this later). Even with this shortcut, Astra will still only have a rocket two years from now that is able to launch 1 Project Kuiper satellite, barely 2 Project Pelican satellites from Planet, and zero Gen2 Starlink satellites.

* * *

In addition to higher payloads, rockets that are partially or fully reusable continue to lower the cost profile of the launch industry. In the conference call announcing Astra’s SPAC merger, management claimed the unit economics of mass manufacturing small rockets could match that of a large rocket. Below we walk through how that falls apart once one factors in the marginal cost of SpaceX’s reusable Falcon 9 and planned Starship.

Marginal Cost Benefit of Reusable Rockets				
	★ ASTRA Rocket 5	SPACEX		
		Reusable Falcon 9	Marginal Cost Falcon 9 Starship	
BOM+ Labor Cost (\$ M)	\$1	\$28	\$15	\$2
Payload to LEO (kg)	500	13,680	13,680	100,000
\$/kg Production Cost	\$2,000	\$2,047	\$1,096	\$20
Timeframe	2025	Now	Now	2022/23

Source: Astra investor presentations, public comments from [Elon Musk](#), [Kerrisdale Analysis](#).

... After the maiden voyage however, Musk has stated the marginal cost of refurbishing and launching a reusable Falcon 9 drops to only \$15m. Applied against a 13,680kg payload, (a reduction of 40%) to account for the reusability of the booster and fairing, and now the incremental cost of production is nearly half that of Astra’s target for 2025. The cost advantage for a re-used Starship is even more dramatic. Musk has outlined the possibility Starship may fly for a marginal

cost of just \$2m, a staggering \$20/kg, orders of magnitude cheaper than anything Astra can hope to achieve (even if one discounts Musk’s hyperbolic tendencies).

Other small launchers in the industry are following SpaceX’s path to capture these economics. Rocket Lab’s Electron is being evolved to become partially reusable using parachutes and mid-air recapture, while its Neutron rocket will be partially reusable thanks to propulsive landing. Relativity Space aims to start flying a fully re-usable, 3D-printed Terran R rocket in 2024. VC start-ups like STOKE are developing reusable rockets. Astra on the other hand, a company with a corporate slogan of “Improve life on Earth from Space,” and a CEO with a “vision of a healthier” planet has no path to developing a reusable rocket, and apparently does not see a problem with having hundreds of rockets land in the ocean every year.

* * *

“Secret” Firefly Engine Deal is Sign of Weakness

On September 21, the tech blog TheVerge.com, reported that Astra agreed to acquire the right to manufacture rocket engines in-house from launch competitor, Firefly Aerospace, for roughly \$30m. The article references internal Firefly documents viewed by the publication and includes specifics which suggest the agreement was leaked by Firefly. Though Astra’s CEO and VP of Communications declined to comment on certain specifics of the agreement, neither disputed its existence (there is no mention of this material agreement in Astra’s SEC filings and no press releases were ever issued by either company). When asked on the last quarterly call about the reported Firefly relationship, management once again did not disclaim the existence of the agreement, stating that anything the analyst had read online was “not inconsistent” with a strategy of all technology being “owned, licensed, or developed by Astra.”

So why the cloak and dagger? Perhaps Astra is aware that buying the IP for the most critical piece of hardware on a rocket from a direct competitor is not exactly a good look. ...

Unsurprisingly, when doing a deal with a competitor, the agreement has some important restrictions. *The IP agreement allegedly includes a clause that only allows Astra to use two Reaver engines per rocket – enough to hit Astra’s goal of 500kg to 500km – but no more. Recall that Firefly is developing a 630kg-1,000kg rocket, and therefore the agreement caps Astra’s use of the IP just below Firefly’s capability and the emerging sweet spot for smaller launchers. Firefly seems content to help Astra for a price – but it isn’t foolish enough to solve a direct competitor’s problem of being undersized.*

(Emphasis added.)

31. The Report stated the following regarding the Company’s reliability and quality issues:

Ignoring Reliability Issues is a Risky Game

Conversations with an individual familiar with Astra’s rocket design and manufacturing suggest investors may have to endure an uncomfortably high rate of failure as the company ramps to a targeted monthly launch cadence in 2022. Astra has previously stated “we’re actually not shooting for 100 percent reliability” and is willing to trade a small amount of reliability for cost savings. Note that, *despite “accepting less than 100%” reliability, Astra’s financial projections as presented during the SPAC process assume zero failures (naturally).*

CEO Chris Kemp has said an 80% success rate is a level Astra internally deems acceptable, substantially lower than the high 90s of far more sophisticated launch programs. *This rate is an aspirational goal as the company continues to test and refine manufacturing, not the company’s current level of anticipated quality. At the current stage of Astra’s development, our source believes the risk of failure is as high as 1 in 2 launches.*

The stakes are now substantially higher. *Astra is trying to develop reliability of a cheap rocket, built without any redundancies*, under the scrutiny of public markets to which it needs continued access.

(Emphasis added.)

32. The Report stated the following regarding the Company’s plans for diversification and its broadband constellation plan:

Space Services Strategy Lacks Clarity and Credibility

In June, Astra announced the acquisition of Apollo Fusion, a manufacturer of electric propulsion engines for small satellites, in a transaction valued up to \$145m (\$30m in stock, \$20m in cash, and an additional \$95m in potential earn-outs). The acquisition is part of a broader trend within the industry to move beyond just launch services to higher margin, in-space sources of revenue. As Firefly CEO Tom Markusic explained, “the rocket gives you the keys to space. It’s critically important, but the big revenue is doing things in space.”

The need for this diversification is driven by the fact that while launching rockets to the heavens can be an awe-inspiring event – as an actual business there’s not a lot to be excited about. *At its core, building and launching rockets is a risky, capital intensive, non-recurring, low-margin hardware business. Greater profits*

(and valuations) lie in moving up the value chain to develop turnkey “space solutions”, orbital transport vehicles, and operating constellations.

* * *

The problem with a small launcher that wants to provide greater service in space is everyone has the same idea. Making orbit transfer vehicles (OTVs) that facilitate “last mile” delivery of a satellite to a specific orbit or moving beyond LEO to MEO [medium Earth orbit], GEO [geosynchronous orbit] and lunar orbits is a crowded field. Our research yielded no fewer than 10 domestic launch providers, component suppliers, rideshare aggregators, and smallsat propulsion manufacturers that have OTVs in development with launch dates over the next 3 years, and another 8 internationally. The prospects for developing a successful broadband constellation is even more challenging. *Astra’s crazily ambitious V-band constellation is years behind Starlink, OneWeb, and Project Kuiper without any of the technical and financial resources, and without a business case that justifies the bootstrapping of yet another broadband mega-constellation.* Taken together, Astra’s acquisition of Apollo Fusion and V-band spectrum application are uninspired attempts at mimicking the strategies of more advanced competitors which underscore the limitations of its undersized rocket in providing in-space solutions.

An engineer we spoke with who is familiar with Apollo Fusion’s history stated the company originally generated excitement within the propulsion community for a system using iodine as a propellant. The technology didn’t work as hoped and within a couple years Apollo transitioned to using Mercury, a low pressure propellant used in thrusters since the 1960’s. Just like iodine, Mercury is toxic, and after the idea of working with a dangerous neurotoxin before showering into the atmosphere was (thankfully) reconsidered, it too was discontinued in favor of Apollo’s current propulsion system based on Xenon and Krypton – propellants that nearly everyone in the propulsion industry has been using for decades. As the expert explained, “[Apollo Fusion] is a company that has made claim 1 and failed, made claim 2 and failed, and is now building something that everyone else has been building forever.” Without any proven technological differentiation, the only way to win business is price, a market position which puts a dent in the strategy of “moving up the value chain.”

Astra’s acquisition of Apollo Fusion is an example of a company making decisions based on what it must do given the limitations of its rocket – not what the market wants, and not what a company without such limitations would ever devise. The right solution for an OTV would have been chemical propulsion but Astra couldn’t go that route because of the bulkier dimensions of the system’s propellant tanks. Under pressure to keep up with competitors, electric propulsion was simply the only option small and light enough to fit in Astra’s rocket. *While others in the industry like Rocket Lab are developing well-suited, best-in-class*

technology, enabling a variety of TAM-expanding missions, Astra is settling for suboptimal acquired technology with only niche applications.

Broadband Constellation Plan is a Pipedream

* * *

A few months after acquiring Apollo Fusion, Astra filed an application with the FCC to use V-band spectrum for a constellation of up to 13,620 satellites. V-band is high frequency spectrum that sits above Ka-band, from 40GHz-75GHz, and is sensitive to rain fade and physical interference. *No ecosystem currently exists to support the use of V-band for space-based telecommunications.* As described by satellite communications expert, Chris Quilty of Quilty Analytics, “It’s expensive, it’s early stage, and there are limited sources of supply. I would argue that companies that are trying to build these components on their own are going to run into significant engineering challenges.”

It’s worth pausing to note the absurdity of the FCC filing: Astra has never built a single satellite; it has not yet proven it can reliably execute on its core business of launching small rockets – and yet, it filed an application for a constellation 2x larger than the next largest proposal from Amazon. While the application technically amounts to little more than a procedural “land grab” for spectrum rights, investors should be concerned about how and why a launch company still working out the kinks of rocket development would even contemplate the endeavor. Unsurprisingly, Kemp seems to want to avoid talking about the entire project.

* * *

And where would the money for any of this come from? Astra only has enough cash on hand to get through 2023 (maybe). Satellite manufacturing, terminal development, gateways, regulatory approval, landing rights...the list goes on and the costs are staggering. Musk has pegged Starlink total investment costs at between \$20 and \$30 billion, OneWeb went bankrupt, and Project Kuiper and Telesat are years behind schedule. *We believe Kemp does not wish to discuss Apollo Fusion technology being used for an internal satellite bus or the development of an Astra constellation, because the enormity of the costs and equity dilution involved would send investors running for the hills.*

Attempts to “expand TAM” through M&A and develop higher margin service revenue are a distraction when Astra hasn’t even executed on its supposed core competency: launching rockets.

(Emphasis added.)

33. On this news, Astra's shares fell \$1.10 per share, or approximately 14%, to close at \$6.61 per share on December 29, 2021, on unusually heavy trading damaging investors.

34. As a result of Defendants' wrongful acts and omissions, and the decline in the market value of the Company's securities, Plaintiff and other Class members have suffered significant losses and damages.

PLAINTIFF'S CLASS ACTION ALLEGATIONS

35. Plaintiff brings this action as a class action pursuant to Federal Rule of Civil Procedure 23(a) and (b)(3) on behalf of a Class, consisting of all those who purchased or otherwise acquired the publicly traded securities of the Company during the Class Period (the "Class") and were damaged upon the revelation of the alleged corrective disclosure. Excluded from the Class are Defendants herein, the officers and directors of the Company, at all relevant times, members of their immediate families and their legal representatives, heirs, successors or assigns and any entity in which Defendants have or had a controlling interest.

36. The members of the Class are so numerous that joinder of all members is impracticable. Throughout the Class Period, the Company's securities were actively traded on the NASDAQ. While the exact number of Class members is unknown to Plaintiff at this time and can be ascertained only through appropriate discovery, Plaintiff believes that there are hundreds or thousands of members in the proposed Class. Record owners and other members of the Class may be identified from records maintained by the Company or its transfer agent and may be notified of the pendency of this action by mail, using the form of notice similar to that customarily used in securities class actions.

37. Plaintiff's claims are typical of the claims of the members of the Class as all members of the Class are similarly affected by Defendants' wrongful conduct in violation of federal law that is complained of herein.

38. Plaintiff will fairly and adequately protect the interests of the members of the Class and has retained counsel competent and experienced in class and securities litigation. Plaintiff has no interests antagonistic to or in conflict with those of the Class.

39. Common questions of law and fact exist as to all members of the Class and predominate over any questions solely affecting individual members of the Class. Among the questions of law and fact common to the Class are:

- (a) whether Defendants' acts as alleged violated the federal securities laws;
- (b) whether Defendants' statements to the investing public during the Class Period misrepresented material facts about the financial condition, business, operations, and management of the Company;
- (c) whether Defendants' statements to the investing public during the Class Period omitted material facts necessary to make the statements made, in light of the circumstances under which they were made, not misleading;
- (d) whether the Individual Defendants caused the Company to issue false and misleading SEC filings and public statements during the Class Period;
- (e) whether Defendants acted knowingly or recklessly in issuing false and misleading SEC filings and public statements during the Class Period;
- (f) whether the prices of the Company's securities during the Class Period were artificially inflated because of the Defendants' conduct complained of herein; and

- (g) whether the members of the Class have sustained damages and, if so, what is the proper measure of damages.

40. A class action is superior to all other available methods for the fair and efficient adjudication of this controversy since joinder of all members is impracticable. Furthermore, as the damages suffered by individual Class members may be relatively small, the expense and burden of individual litigation make it impossible for members of the Class to individually redress the wrongs done to them. There will be no difficulty in the management of this action as a class action.

41. Plaintiff will rely, in part, upon the presumption of reliance established by the fraud-on-the-market doctrine in that:

- (a) Defendants made public misrepresentations or failed to disclose material facts during the Class Period;
- (b) the omissions and misrepresentations were material;
- (c) the Company's securities are traded in efficient markets;
- (d) the Company's securities were liquid and traded with moderate to heavy volume during the Class Period;
- (e) the Company traded on the NASDAQ, and was covered by market analysts;
- (f) the misrepresentations and omissions alleged would tend to induce a reasonable investor to misjudge the value of the Company's securities;
- (g) Plaintiff and members of the Class purchased and/or sold the Company's securities between the time the Defendants failed to disclose or misrepresented material facts and the time the true facts were disclosed, without knowledge of the omitted or misrepresented facts; and

(h) Unexpected material news about the Company was rapidly reflected in and incorporated into the Company's stock price during the Class Period.

42. Based upon the foregoing, Plaintiff and the members of the Class are entitled to a presumption of reliance upon the integrity of the market.

43. Alternatively, Plaintiff and the members of the Class are entitled to the presumption of reliance established by the Supreme Court in *Affiliated Ute Citizens of the State of Utah v. United States*, 406 U.S. 128, 92 S. Ct. 2430 (1972), as Defendants omitted material information in their Class Period statements in violation of a duty to disclose such information, as detailed above.

COUNT I

Violation of Section 10(b) of The Exchange Act and Rule 10b-5 Against All Defendants

44. Plaintiff repeats and realleges each and every allegation contained above as if fully set forth herein.

45. This Count is asserted against the Defendants and is based upon Section 10(b) of the Exchange Act, 15 U.S.C. § 78j(b), and Rule 10b-5 promulgated thereunder by the SEC.

46. During the Class Period, the Defendants, individually and in concert, directly or indirectly, disseminated or approved the false statements specified above, which they knew or deliberately disregarded were misleading in that they contained misrepresentations and failed to disclose material facts necessary in order to make the statements made, in light of the circumstances under which they were made, not misleading.

47. The Defendants violated §10(b) of the 1934 Act and Rule 10b-5 in that they: employed devices, schemes and artifices to defraud; made untrue statements of material facts or omitted to state material facts necessary in order to make the statements made, in light of the

circumstances under which they were made, not misleading; and/or engaged in acts, practices and a course of business that operated as a fraud or deceit upon plaintiff and others similarly situated in connection with their purchases of the Company's securities during the Class Period.

48. The Defendants acted with scienter in that they knew that the public documents and statements issued or disseminated in the name of the Company were materially false and misleading; knew that such statements or documents would be issued or disseminated to the investing public; and knowingly and substantially participated, or acquiesced in the issuance or dissemination of such statements or documents as primary violations of the securities laws. These defendants by virtue of their receipt of information reflecting the true facts of the Company, their control over, and/or receipt and/or modification of the Company's allegedly materially misleading statements, and/or their associations with the Company which made them privy to confidential proprietary information concerning the Company, participated in the fraudulent scheme alleged herein.

49. Individual Defendants, who are a senior officers and/or directors of the Company, had actual knowledge of the material omissions and/or the falsity of the material statements set forth above, and intended to deceive Plaintiff and the other members of the Class, or, in the alternative, acted with reckless disregard for the truth when they failed to ascertain and disclose the true facts in the statements made by them or other personnel of the Company to members of the investing public, including Plaintiff and the Class.

50. As a result of the foregoing, the market price of the Company's securities was artificially inflated during the Class Period. In ignorance of the falsity of the Defendants' statements, Plaintiff and the other members of the Class relied on the statements described above and/or the integrity of the market price of the Company's securities during the Class Period in

purchasing the Company's securities at prices that were artificially inflated as a result of the Defendants' false and misleading statements.

51. Had Plaintiff and the other members of the Class been aware that the market price of the Company's securities had been artificially and falsely inflated by the Defendants' misleading statements and by the material adverse information which the Defendants did not disclose, they would not have purchased the Company's securities at the artificially inflated prices that they did, or at all.

52. As a result of the wrongful conduct alleged herein, Plaintiff and other members of the Class have suffered damages in an amount to be established at trial.

53. By reason of the foregoing, the Defendants have violated Section 10(b) of the 1934 Act and Rule 10b-5 promulgated thereunder and are liable to the Plaintiff and the other members of the Class for substantial damages which they suffered in connection with their purchases of the Company's securities during the Class Period.

COUNT II

Violation of Section 20(a) of The Exchange Act Against The Individual Defendants

54. Plaintiff repeats and realleges each and every allegation contained in the foregoing paragraphs as if fully set forth herein.

55. During the Class Period, the Individual Defendants participated in the operation and management of the Company, and conducted and participated, directly and indirectly, in the conduct of the Company's business affairs. Because of their senior positions, they knew the adverse non-public information regarding the Company's business practices.

56. As officers and directors of a publicly owned company, the Individual Defendants had a duty to disseminate accurate and truthful information with respect to the Company's

financial condition and results of operations, and to correct promptly any public statements issued by the Company which had become materially false or misleading.

57. Because of their positions of control and authority as senior officers and/or directors, the Individual Defendants were able to, and did, control the contents of the various reports, press releases and public filings which the Company disseminated in the marketplace during the Class Period. Throughout the Class Period, the Individual Defendants exercised their power and authority to cause the Company to engage in the wrongful acts complained of herein. The Individual Defendants, therefore, were each a “controlling person[]” of the Company within the meaning of Section 20(a) of the Exchange Act. In this capacity, they participated in the unlawful conduct alleged which artificially inflated the market price of the Company’s securities.

58. The Individual Defendants, therefore, acted as controlling persons of the Company. By reason of their senior management positions and being a director of the Company, the Individual Defendants had the power to direct the actions of, and exercised the same to cause, the Company to engage in the unlawful acts and conduct complained of herein. The Individual Defendants exercised control over the general operations of the Company and possessed the power to control the specific activities which comprise the primary violations about which Plaintiff and the other members of the Class complain.

59. By reason of the above conduct, the Individual Defendants are liable pursuant to Section 20(a) of the Exchange Act for the violations committed by the Company.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff demands judgment against Defendants as follows:

A. Determining that the instant action may be maintained as a class action under Rule 23 of the Federal Rules of Civil Procedure, and certifying Plaintiff as the Class representative;

B. Requiring Defendants to pay damages sustained by Plaintiff and the Class by reason of the acts and transactions alleged herein;

C. Awarding Plaintiff and the other members of the Class prejudgment and post-judgment interest, as well as their reasonable attorneys' fees, expert fees, and other costs; and

D. Awarding such other and further relief as this Court may deem just and proper.

DEMAND FOR TRIAL BY JURY

Plaintiff hereby demands a trial by jury.

Dated: February 9, 2022

Respectfully submitted,

THE ROSEN LAW FIRM, P.A.

/s/ Phillip Kim

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