UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
WASHINGTON, D.C. 20549

FORM 8-K

CURRENT REPORT

Pursuant to Section 13 or 15(d) of the Securities Exchange Act of 1934

Date of Report (Date of earliest event reported): November 7, 2022

Astra Space, Inc.

(Exact name of Registrant as Specified in Its Charter)

Delaware	**001-39426**	**85-1270303**
(State or Other Jurisdiction of Incorporation)	**(Commission File Number)**	**(IRS Employer Identification No.)**
1900 Skyhawk Street Alameda, California		**94501**
(Address of Principal Executive Offices)		**(Zip Code)**

Registrant's Telephone Number, Including Area Code: (866) 278-7217

Check the appropriate box below if the Form 8-K filing is intended to simultaneously satisfy the filing obligation of the registrant under any of the following provisions:

☐ Written communications pursuant to Rule 425 under the Securities Act (17 CFR 230.425)

☐ Soliciting material pursuant to Rule 14a-12 under the Exchange Act (17 CFR 240.14a-12)

☐ Pre-commencement communications pursuant to Rule 14d-2(b) under the Exchange Act (17 CFR 240.14d-2(b))

☐ Pre-commencement communications pursuant to Rule 13e-4(c) under the Exchange Act (17 CFR 240.13e-4(c))

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	ASTR	NASDAQ Global Select Market

Indicate by check mark whether the registrant is an emerging growth company as defined in Rule 405 of the Securities Act of 1933 (§ 230.405 of this chapter) or Rule 12b-2 of the Securities Exchange Act of 1934 (§ 240.12b-2 of this chapter).

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. ☐

Item 8.01 Other Events.

On November 7, 2022, Astra Space, Inc. ("Astra") published a blog post providing an update on the development and design of Launch System 2. This blog post was accompanied by a video related to Launch System 2. Both the blog post and the video are available on Astra's website at astra.com. A copy of Astra's blog post and a transcript of the video are attached hereto as Exhibit 99.1 and Exhibit 99.2, respectively.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

Exhibit No.	Description
99.1	Blog Post issued by Astra Space, Inc. on November 7, 2022
99.2	Transcript of Video released by Astra Space, Inc. on November 7, 2022
104	Cover Page Interactive Data File (embedded with the Inline XBRL document)

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.

Date: November 7, 2022

Astra Space, Inc.

By: /s/ Chris Kemp

Name: Chris Kemp

Title: Chief Executive Officer

Launch System 2 Update

By Chris Kemp, Founder, Chairman, and CEO, Astra

Since Astra's founding in 2016 we've been on a mission to Improve Life on Earth from Space® by delivering customer payloads to orbit through frequent and reliable dedicated launches as economically as possible.

Our goal with Launch System 1 was to achieve orbital capability as quickly as possible and demonstrate that we could mass-produce rockets. And we did, by launching incrementally more capable rockets – 1.0, 2.0, 3.0, 3.1, 3.2, and finally a series of Rocket 3.3 rockets that made Astra the fastest privately funded U.S. company to reach orbit.

Following the flight anomaly on our last launch, we listened to our customers, our team, and our stockholders and made the strategic decision to accelerate the introduction of a higher performance rocket and add additional testing that we believe will increase the reliability of future launches.

Launch System 2 is our answer to our existing launch customers, and an increasing number of satellite operators around the world, that need affordable and frequent dedicated orbital launch services to enable new space services. These launch services have the potential to unlock next generation communications services, critical national security and defense applications, and a wide range of Earth observation capabilities that will create a healthier planet.

We believe Launch System 2 will provide Astra's customers the launch services they need, whether that be constellation deployment, constellation management, or responsive missions. Dedicated small launches give satellite operators the ability to deploy their spacecraft directly to their operational orbits and allow them to start providing services and adding value sooner.

Our customers and the broader market were clear about wanting three things from Astra's new launch system: reliability, increased payload capacity, and an increased launch cadence. Launch System 2 has been specifically designed to address these needs.

While Launch System 1 made Astra the fastest privately funded U.S. company to reach orbit, the goal of Launch System 2 is to build a highly reliable system that we believe can scale to a weekly launch cadence.

Designed for Reliability & Scaled Manufacturing

While the new launch system builds on the heritage of Launch System 1, Launch System 2 is more than just upgraded hardware – it represents a cultural shift from our primary focus on *schedule* to a focus on *reliability*. This launch system is the result of a significant change in how Astra designs, builds, qualifies, and operates our launch system.

While Launch System 1 began its initial development with just a handful of people in a garage six years ago, Launch System 2 is being designed by *teams* of world-class engineers in a 225,000 sq. ft. manufacturing and testing facility.

We are a completely different company than when we designed Launch System 1 and that shows in the level of investment we're making into the reliability of this system. The entire system has been scrutinized, and re-engineered where necessary, to support our plans to reliably and repeatably deliver our customers' payloads to orbit.

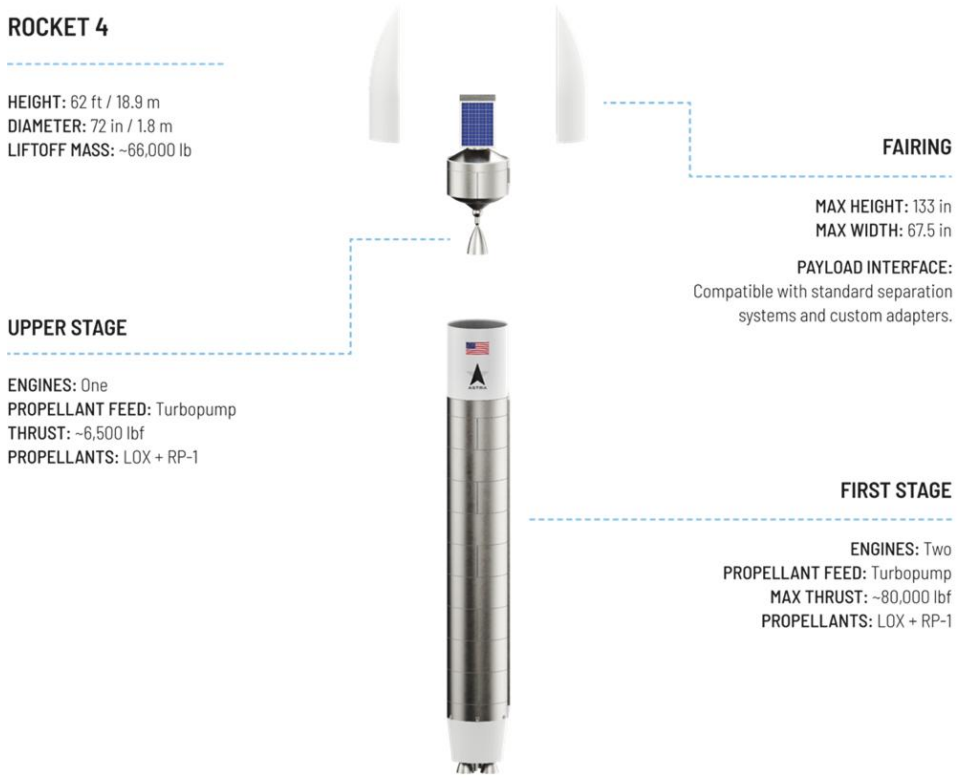
This shift encompasses every stage of the development process, with multiple teams in the organization focused primarily on reliability, quality, and system safety. We're better-resourced across the board than we were during the development of Launch System 1, including the creation of a new System Verification and Assurance team, quality control lab, and failure analysis lab with state-of-the-art testing capabilities.

A reliable launch system is about much more than just a rocket, it's about creating an integrated system that works seamlessly together. The launch system is comprised of three key subsystems:

- Rocket – the launch vehicle itself, which ultimately delivers payloads into their final orbit
- Ground System – the infrastructure on the pad when Astra launches
- Mission Control – the interface between our operators and the rocket

Rocket

Rocket 4 builds on the heritage, flight-proven designs, and manufacturing techniques of hundreds of subsystems demonstrated during the successful orbital flights of the 3 series rockets, but there are several key changes to the Rocket 4 architecture.



Increased Size and Capacity

Rocket 4 will stand 62 feet from tip to tail, with a total diameter of 72 inches. This overall size increase allows the vehicle to carry greater volumes of propellant, and in turn deploy significantly more payload mass – with a target payload capacity of 600 kg to mid-inclination 500 km low Earth orbit over the course of the product lifecycle.

Increased Fairing Volume

Rocket 4's increased diameter provides a dramatic increase in the volume available for our customers' spacecraft. This increased fairing was designed to fit one ESPA Grande spacecraft, two ESPA spacecraft, or multiple CubeSats – with a maximum height of 133 inches and a maximum width of 67.5 inches.

Updated First Stage Architecture

Rocket 4's first-stage architecture uses much of the same architecture from Rocket 3.3, with two key updates that will dramatically improve performance and manufacturability. First, the domes are now stamped directly from single sheets of aluminum, reducing weight and streamlining overall manufacturability – which in turn reduces launch costs for our customers.

Second, the first stage engine architecture has been simplified from five battery pump-fed engines to two turbopump-fed engines and will deliver a maximum combined liftoff thrust of approximately 80,000 lb. Astra is developing and qualifying an upgraded derivative of a previously qualified engine for this application.

Updated Upper Stage Architecture

The upper stage has undergone the largest architectural change from Rocket 3.3. Rocket 4's upper stage has moved to a full-diameter, common dome design – which aligns production approaches between the two stages – increasing build reliability and decreasing total manufacturing costs. The upper stage is propelled by a turbopump-fed liquid oxygen/kerosene engine delivering ~6,500 lbf. of vacuum thrust. This engine is also a derivative of an existing qualified engine.

Ground System

One of Astra's core values is "simple scales," and that is reflected in the goal to develop an easy-to-deploy, mobile launch system. The ground system has undergone several impactful updates that simplify the system and support scaled launch operations:

- Optimized for improved site turnaround: critical systems have been moved from the launcher into two easy-to-access containers on the launch site, shielding critical components and simplifying maintenance between launches.
- Designed for mobility: despite the overall size increase of the rocket, the launcher and rocket are still designed to fit within standard sized shipping containers, ensuring that Astra's launch system remains easy to deploy by land, sea, or air.
- Designed for automation: Launch System 2 uses sensors and valves that can detect issues and "report back" to launch operators in real time, flagging anomalies in the system and mitigating issues through early detection.

Mission Control

Launch System 2 provides Astra an opportunity to further improve the interface between our Launch Operations team and the launch system hardware. Key updates being made to mission control are:

- Increased automation through software improvements to eliminate more opportunities for human error – creating a more scalable and reliable launch system.
- Simplifying pre-launch procedures to reduce the number of mission control operators: the end goal for Launch System 2 is to reduce the number of mission control operators from **four** to **two**. Simplified procedures and increased automation will effectively double Astra's mission control teams with no additional headcount – reducing launch costs for customers.

Path to Launch

We expect Launch System 2 to deliver best-in-class launch economics and launch frequency via a platform that is being optimized for reliability at every phase of the development process. It's an

incredibly exciting time to be bringing this new launch system to market, which we have designed from the ground up to deliver the launch services that we understand our customers need.

We will continue to provide updates on the key development, testing, and qualification milestones for Launch System 2 as we continue with its development.

SAFE HARBOR STATEMENT

Certain statements made in this blog post are "forward-looking statements". Forward-looking statements may be identified by the use of words such as "anticipate", "believe", "expect", "estimate", "plan", "outlook", and "project" and other similar expressions that predict or indicate future events or trends or that are not statements of historical matters. These forward-looking statements reflect the current analysis of existing information and are subject to various risks and uncertainties. As a result, caution must be exercised in relying on forward-looking statement. These risks and factors include our ability to meet projected launch system development targets, as well as those risks and uncertainties discussed from time to time in other reports and other public filings with the Securities and Exchange Commission by Astra.

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This is more than just about a new launch system. It's about a new commitment to our customers, to reliability, to quality, to rigor. And you'll see it across everything we're building, designing, operating our processes, our team, our culture. And the journey here will be manifested in one thing: a successful flight again and again and again.

Early Astra focus was on speed and getting to orbit, demonstrating orbital capability with our mass producible rocket design as quickly as possible.

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And that's because with every launch we learned and were able to iterate the vehicle. And now we've learned a lot, so it's time for us to consolidate those lessons and build them into a much more fundamentally reliable launch system.

When we talk to our customers in the market, they told us they needed this larger vehicle sooner. And that's what we've used as kind of our principle to accelerate this road map and build this launch system forward.

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The launch system is really our next step, not just in the evolution of the launch system, but also in the evolution of how we do product development at Astra. So it's really a significant shift, almost like an Astra 2.0 in terms of how we do design, how we do verification, and then eventually how we conduct our missions and launches with a vehicle that is generated out of that new process.

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We look at our strategy for mission success in terms of four key components. During the design phase: having strong reliability controls — building in redundancy from day one. During qualification: making sure that we test as we fly and we do a robust verification and validation plan before we ever launch for the first time. During build: having strong quality controls, supplier quality, quality in our factory, and acceptance testing that shows that every product that's going on a rocket for flight is ready for flight.

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And during operations, making sure that we're ready when we arrive at the launch site to conduct operations safely and successfully.

Folks pay a lot of attention to the rocket because it's the thing that flies to space. But in reality, the launch system is made up of three key systems: the rocket, the ground system and mission control. And they all have to work as one in order to achieve a successful launch.

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So all three things need to be concurrently engineered at all times and evolved at all times to be compatible with each other.

The end goal of Astra's mission control is to get to the point that there's just a flight director and a vehicle operator, and between the two of them, they have all of the tools they need in front of them to be able to successfully navigate a nominal launch campaign.

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So it's the whole package of fewer personnel, higher automation and the remote ability to do all this, which adds to the efficiency and effectiveness in our ability to go do this from anywhere in the world.

Ground infrastructure plays a big role in the reliability of the system. It improves mobility, it improves technician accessibility.

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It's designed with serviceability in the field, not needing specialized tools or equipment. The entire system is designed to be more robust and easier and simpler for everybody to work on so that way we can turn it around a lot quicker and fly more often.

Rocket 4 leverages learnings from a previous orbital launch system in a new architecture that significantly increases its payload capacity and increases the overall reliability and manufacturability of the launch vehicle.

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Rocket 4 is a two stage vertically launched LOx-kerosene rocket. The structure is built almost entirely from metal with a focus on manufacturing techniques that enable cost effective production at scale. Rocket 4 will stand 62 feet tall with a diameter of 72 inches and a gross lift off mass of approximately 66,000 pounds. The first stage architecture remains largely the same.

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The propulsion system has moved from five battery pump fed engines to two turbo pump fed engines, which are expected to provide a combined maximum sea level liftoff thrust of 80,000. The biggest architectural update to Rocket 4 comes in the form of the upper stage — which is now a common dome, common diameter stage. This will reduce the amount of redundant structure and aligns production approaches between the two stages.

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The upper stage is powered by a turbo pump fed engine, which produces approximately 6500 pounds of vacuum thrust. The full diameter fairing and Rocket 4 provides a major increase in usable payload volume, while building on a flight-proven architecture for separation. This fairing is designed to fit one ESPA grande payload, two ESPA class payloads or several CubeSats.

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Rocket 4 will have a maximum payload capacity of 600 kilograms to 500 kilometers mid-inclination over the course of the product lifecycle.

We continue to believe that small, dedicated, cost-effective launch is needed by the market and will be rewarded by our customers. And so fundamentally we continue to invest in the idea of small launch, designed for, executed for, manufactured for, and delivered at scale.

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There's a lot of discussion in the market around launch cost, and that typically translates into dollars per kilogram. But in speaking with customers, there's a lot more to it. And there are more factors that they consider, including time to manifest, time to get to the desired orbit and ultimately being in control. And so that's what we strive to deliver on with our customer experience.

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We're here to support you along that journey to make your mission successful.

Chris Kemp stood in front of us and gave us a challenge, gave Astra a challenge. Myself and others have taken that to heart, and we need to build a culture surrounded by expecting and delivering success right out of the gate.