Filed Pursuant to Rule (424)(b)(3)
Registration No. 333-257930

PROSPECTUS SUPPLEMENT NO. 18
(to Prospectus dated August 12, 2021)

ASTRA SPACE, INC.

Primary Offering Of
15,333,303 Shares of Common Stock

Secondary Offering of
189,026,575 Shares of Common Stock
5,333,333 Warrants to Purchase Common Stock

This prospectus supplement amends and supplements the prospectus dated August 12, 2021 (as supplemented or amended from time to time, the "Prospectus"), which forms a part of our Registration Statement on Form S-1 (No. 333-257930). This prospectus supplement is being filed to update and supplement the information in the Prospectus with the information contained in our Current Report on Form 8-K, filed with the Securities and Exchange Commission on November 22, 2021 (the "Current Report"). Accordingly, we have attached the Current Report to this prospectus supplement.

The Prospectus and this prospectus supplement relate to the issuance by us of up to an aggregate of (i) 9,999,970 shares of our Class A common stock that may be issued upon exercise of warrants to purchase Class A common stock at an exercise price of $11.50 per share (the "public warrants") issued by Holicity Inc. ("Holicity") in its initial public offering; and (ii) 5,333,333 shares of our Class A common stock that may be issued upon exercise of private placement warrants at an exercise price of $11.50 per share that were originally sold to X-icity Holdings Corporation (the "Sponsor") in a private placement consummated simultaneously with Holicity's IPO (the "private placement warrants" and, together with the public warrants, the "warrants").

The Prospectus and this prospectus supplement also relate to the offer and sale, from time to time, by the selling securityholders named in this prospectus (the "Selling Securityholders"), or any of their permitted transferees, of (i) 5,333,333 private placement warrants; (ii) up to an aggregate of 5,333,333 shares of our Class A common stock that may be issued upon exercise of the private placement warrants held by the Selling Securityholders; (iii) up to an aggregate of 20,000,000 shares of our Class A common stock that were issued to certain investors (collectively, the "PIPE Investors") in a private placement in connection with the closing of the Business Combination (as defined herein); (iv) 7,500,000 shares of Class A common stock issued to the Sponsor prior to Holicity's initial public offering and registered for sale by the Selling Securityholders; (v) up to an aggregate of 92,277,793 shares of Class A common stock that were issued to certain affiliates of Astra (collectively, the "Astra Affiliates") pursuant to the Business Combination Agreement (as defined herein); (vi) up to an aggregate 56,239,188 shares of Class A common stock issuable upon conversion (on a one-for-one basis) of shares of our Class B common stock, par value $0.0001 per share ("Class B Common Stock") held by certain Selling Securityholders and (vii) up to an aggregate of 7,676,261 shares of our Class A common stock issued in connection with our acquisition of Apollo Fusion, Inc. ("Apollo Fusion"), which closed on July 1, 2021 comprised of (x) 2,558,744 shares of our Class A common stock (the "Initial Apollo Shares") issued to certain of the Selling Securityholders on July 1, 2021, in connection with our merger with Apollo Fusion, Inc. ("Apollo Fusion") and (y) 5,117,517 additional shares of our Class A common stock (the "Additional Apollo Shares") which may be issued to certain of the Selling Securityholders assuming (a) the achievement of all remaining performance milestones set forth in the Apollo Fusion Merger Agreement (as defined herein), (b) we elect to pay all future milestone consideration in shares of our Class A common stock as required by the terms the Apollo Fusion Merger Agreement, and (c) the per share price used to calculate the number of shares of our Class A common stock to be issued is $11.7243, which is the same per share price used to calculate the number of Initial Shares issued to the Selling Securityholders. The Additional Shares have not been earned and are not currently outstanding. The actual number of Additional Shares issued to the selling stockholders could be materially greater or less than 5,117,517 shares of Class A common stock depending whether and to what extent the future performance milestones are met and/or the actual average closing price of our Class A common stock at the time such milestones are achieved. The Prospectus and this prospectus supplement also cover any additional securities that may become issuable by reason of share splits, share dividends or other similar transactions.

Our common stock and warrants are listed on Nasdaq under the symbols "ASTR" and "ASTRW", respectively. On November 19, 2021, the closing price of our common stock was $9.53 per share and the closing price of our warrants was $2.89 per share.

This prospectus supplement updates and supplements the information in the Prospectus and is not complete without, and may not be delivered or utilized except in combination with, the Prospectus, including any amendments or supplements thereto. This prospectus supplement should be read in conjunction with the Prospectus and if there is any inconsistency between the information in the Prospectus and this prospectus supplement, you should rely on the information in this prospectus supplement.

Investing in our securities involves risks that are described in the "Risk Factors" section beginning on page 15 of the Prospectus.

Neither the SEC nor any state securities commission has approved or disapproved of the securities to be issued under the Prospectus or determined if the Prospectus or this prospectus supplement is truthful or complete. Any representation to the contrary is a criminal offense.

The date of this prospectus supplement is November 22, 2021.

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 20, 2021

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**
Warrants to purchase one share of Class A common stock, each at an exercise price of $11.50	**ASTRW**	**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.

We have furnished the transcript of the video from our commercial orbital launch on November 20, 2021, as Exhibit 99.1. This exhibit shall not be deemed filed for purposes of the Securities Exchange Act of 1934, as amended (the "Exchange Act") or incorporated by reference in any filing under the Securities Act of 1933, as amended, or Exchange Act, except as shall be expressly set forth by specific reference in such a filing.

Item 9.01 Financial Statements and Exhibits.

(d) Exhibits

Exhibit No.	Description
99.1	Transcript of livestream video for launch attempt on November 20, 2021
104	Cover Page Interactive Data File (embedded within 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 22, 2021

Astra Space, Inc.

By: /s/ Kelyn Brannon
Name: Kelyn Brannon
Title: Chief Financial Officer

Exhibit 99.1

Astra Test Flight (Launch Vehicle 0007)
Eastern Time

Saturday, 20th November 2021

[Stream Intro]

We have lift off!

Propulsion continues to be nominal

Chamber pressure looks good

Throttling up

Roger roll, Atlantis

Water towers, fly! Yes!

Eagle delta nominal

[Inaudible]

Yikes!

You bet

Concur

We don't need any more of these

Thomas Burghardt (NASASpaceFlight.com): Hello, everyone. You are looking live at Launch Vehicle 0007 on the pad of the Pacific Spaceport Complex in Kodiak Island, Alaska. Astra is currently at T minus 42 minutes and counting and we are anticipating a hold at T minus 30 minutes for propellant load operations to complete. So, we are coming to you live now from Astra's headquarters in Alameda, California. My name is Thomas Burghardt, news director for NASASpaceFlight. I am joined by Carolina Grossman, the director of product management at Astra. Carolina, thanks for being on tonight.

Carolina Grossman (Astra): Thank you. Very excited to be here for our next launch attempt.

Thomas Burghardt: Astra and NASASpaceFlight are partnering once again to bring you this live stream. So, thanks to Astra for covering some expenses involved in making that happen. Also, as usual, we will be taking your questions from chat. So, if you have a question about today's launch, please tag us with @NASASpaceFlight. We are going to bring in as many of those as we can and answer as many as we can over the course of the broadcast.

If you were with us last night, you saw that there was a launch attempt that was scrubbed late in the countdown and we have some more information about that. Carolina, what went on last night?

Carolina Grossman: Yeah. So, if you were with us last night, we had a scrub at T minus roughly 12 minutes before our T-zero time. And unfortunately, last night was very, very cold in Kodiak. It was negative 8° Celsius or 18° Fahrenheit. And even though over the last couple of weeks as we have been testing our system up in Kodiak, we have learned how to mitigate a lot of the weather issues that we have encountered in these extraordinarily cold conditions. However, last night, we did find some frozen moisture in our ignitor system that we were unable to clear in time for our planned T-zero time.

So, the team today has reviewed the system and implemented a few mitigations that we believe have resolved the issue. And so far, this evening, the system appears to be working nominally.

Thomas Burghardt: Sounds good. Hoping for a smooth countdown and hopefully a launch today. Again, we are expecting a hold at T minus 30 minutes, which is why that countdown clock is already at T minus 40. But we are expecting a little bit of a delay later in the countdown but hoping that will go smoothly and we will get to a launch sooner rather than later. Carolina, where are we in the countdown right now?

Carolina Grossman: Sure. So, as you can see on your screen, you can see that middle portion of the rocket. That is the first stage; liquid oxygen tank is filling up. It is indicated by the icy condensation starting to form around it. And so, we will continue with our propellant-loading operations. Otherwise, we are keeping an eye on the winds tonight as usual. However, the conditions do look good for our flight tonight.

Thomas Burghardt: Sounds good. Again, please, questions in the chat, we will start bringing those in just a second. I want to look back just a couple days because we have not shown this yet. We have some video of the static fire test, which precedes the launch attempt, happened just a few days ago in Kodiak Island. Let us take a look.

[Static Fire Test Video]

Thomas Burghardt: So, we saw there the water deluge, everything and the engines ignite. Now, can you tell me exactly, what are the test objectives for a static fire test?

Carolina Grossman: Sure. So, the static fire is essentially our last real full-dress rehearsal of the system to make sure everything is working exactly like it will on launch day. The main difference that you see between a static fire test and a launch attempt is that we do not let the engines go. So, during a static fire test, we load our propellant exactly as we intend to on launch day. We ignite the engines. We run them for a few seconds to make sure that everything is working fine. And then once we have confirmed that we have obtained the necessary data, then we shut off the engine. And so, that test happened earlier this week. And within really a matter of hours, the team was able to reset and prepare for tonight's launch attempt.

Thomas Burghardt: And there was something unique about this particular launch campaign that happened in the last – because that is a little bit different from how it has been done in the past, right?

Carolina Grossman: Yes, that is right. So, usually, we will complete the static fire test closer to our headquarters here in Alameda. We perform the test out in the Central California Valley a couple hours from our headquarters. But this time, we decided to perform the test up at our launch site. And so, we are very grateful for the partnership of the Pacific Spaceport Complex – Alaska and the Alaska Aerospace Corporation in working with us to allow us to test in more launch-like conditions, which has been very helpful since these are really cool temperatures that we have been seeing. And over the last couple weeks of working towards our static fire test, we have gotten to learn a lot and iterate very quickly in order to get to this point.

Thomas Burghardt: Has that also changed simply since the last launch, which of course was also in Kodiak but was not in November? Is there a big difference there too?

Carolina Grossman: Right. So, our last launch was in August with warmer temperatures. And then prior to that, we had launched in December of last year with our Rocket 3.2. And those launches both occurred during the daytime.

Thomas Burghardt: Right.

Carolina Grossman: And so even though the December conditions in Kodiak can also be very cold, these nighttime conditions are some of the coldest that we have experienced with our system to date.

Thomas Burghardt: Got you, got you. All right. We got some questions coming in from chat so let us dive into these. The first question comes from Tucker and we are talking about Astra's overall mission asking, what is Astra's ultimate goal with launching a rocket every single day by 2025? What exactly are you launching that it needs to be daily?

Carolina Grossman: Sure. So, Astra's mission is to improve life on earth from space. And we are seeing a lot of really small cubesats and microsats that want to help observe and connect and help do those kinds of things that Astra is trying to do with its mission. So, we see actually a lot of demand for launch from every day. And right now, access to space and launch access is one of the biggest bottlenecks in the industry. So, we see that there's a lot more satellites that are projected to be built in the coming years that we think that there will be demand for launches every single day.

Thomas Burghardt: Is that more like – because I think Chris Kemp, he has spoken on NSF Live before, he has spoken on the meet the team video – by the way, if you have not seen the meet the team video, check it out on the NASASpaceFlight channel – but a lot of them describe it more of like a service. You take a package to UPS or FedEx or something and you say, 'I need this to go someplace.' They do not schedule a flight right then and there, right? They already have flights scheduled. It is just a matter of putting payloads on board. Is that kind of what Astra is aiming for?

Carolina Grossman: Yeah, yeah. That is right. We want to make it as simple and easy. And I think right now, it can take many months or even years from the time that a satellite wants to get a ride up to space to the time that it can actually make it on to orbit. And so, yeah, we want to make it as easy to send a satellite to orbit as it is to send a package across the country. And I am really excited for the future that we will build when that is possible.

Thomas Burghardt: It is definitely very interesting, something very different from other space flight companies that we look at. So, it is interesting to talk about. Let us bring some more questions into chat here and here we go. Nick from chat asking, where can we buy some of those water bottles or any Astra swag? Got a product placement here on the desk.

Carolina Grossman: Yeah. That is a great question. And right now, we do not have a store where you can buy Astra swag. So, the only way that you can get some Astra swag is to come join us. You can check out our open positions at Astra.com and our careers page there. And we are hiring for a ton of roles across the company. We will also be looking into an internship program as well. So, please, make sure to check our careers page for your own opportunities to get some cool Astra swag.

Thomas Burghardt: We get a lot of questions in chat almost every stream about how to get involved in the industry, how to get jobs and different things, of course, asking Astra directly through these cool broadcasts. But it is exciting to see people like that in chat and glad that we are getting some people excited about space and stuff. I love that stuff.

Another question here from the Oort cloud. I do not know if it is from the actual Oort cloud but the question asks, what changes have been made to LV0007 to prevent a LV0006 from happening again?

Carolina Grossman: That is a great question. So, if you watched our LV0006 launch in August, you may have remembered, it went a little sideways. It was certainly a unique launch that we had, certainly nothing like I have ever seen before. And what happened is that the propellant system that loads on to the vehicle is designed to quickly seal off and disconnect when the vehicle lifts off. But unfortunately, a very small amount of propellant leaked out of that system. And due to the very, very hot exhaust of the engines, it ignited and caused some of the electronics on one of our five first-stage Delphin engines to send a signal to shut off one of those five engines.

And so, all of this happened within one second of launch. And because we lost one of those engines, the vehicle essentially burned off and lost some of that mass of the propellant and did that cool hover maneuver until it achieved a sufficient thrust-to-weight ratio to actually lift off.

And so, the changes that we have made primarily focused on that propellant-loading system. And so, we have relocated and changed how that system onboards the propellant on to the rocket to make sure that in the unlikely event that anything should leak, it will be much less likely to mix and cause a similar situation.

And more broadly, we looked at how we tested and verified that system and implemented some changes into how we do our component testing and verification more broadly to help prevent these kinds of issues from happening in the future.

And I just want to commend the team for working really, really hard. We are talking combing through data by the millisecond and working very, very hard over the course of just a matter of weeks to complete this work and get us back to the pad really quickly.

Thomas Burghardt: Absolutely. And it is still worth mentioning though that this is actually the second Rocket 3.3 because there are kind of two different naming schemes to talk about. There is the version of the Rocket, which even though this LV0007 is different from LV0006; they are both in the 3.3 classification. Can you tell me what the difference between those two schemes are?

Carolina Grossman: Sure. So, kind of like a software release version, Rocket 3.3 is like the overall release. We constantly intend to be iterating and making small changes to the vehicle but 3.3 number is really like the class of this Rocket. And so, there were really substantial changes between the Rocket 3.2 launch in December and this current Rocket 3.3 vehicle. But in essence, we expect the changes from tail number to tail number of this Rocket to be pretty similar. And so, we will just continue to refer to them by their tail number without really changing that class or release number.

Thomas Burghardt: Got you.

Carolina Grossman: Until we get to sort of our next major iteration of the vehicle.

Thomas Burghardt: Got you. And so, this is the seventh launch vehicle but the second of Rocket 3.3, that version, and this is actually the fourth overall orbital launch attempt, again, to demonstrate that orbital capability before moving into customer flights.

In the meantime, we have just hit that T minus 30-minute mark. And as we said, we are expecting them to hold there. So, we are in this hold. The teams are currently working to just complete propellant load operations. And once this hold is released, we will have a new target T-zero time and an actual target time for lift off. So, we will bring that to you as soon as we have it as the teams continue to work it.

In the meantime, we are going to keep the Q&A going here. And again, if you have questions, please tag us @NASASpaceFlight in chat. And my first question comes from Tin Man that says how tall is the rocket and what propellant does it use?

Carolina Grossman: Yeah. So, we will definitely be talking a lot about the specs of our vehicle. But overall, our vehicle is 43 feet long from tip to tail. So, it fits pretty snuggly in a 45-foot shipping container, which helps make our logistics and transport to the site pretty easy. And as far as the propellants, both stages use a combination of liquid oxygen and RPX, which is essentially kerosene. And so, both are first stage powered by the Delphin engines and our upper stage powered by the Aether engine use those propellants.

Thomas Burghardt: And to differentiate, because there are a few rockets that use kerosene and liquid oxygen – it's a pretty common mixture – Falcon 9, Atlas V to name a few. But those actually usually use an RP-1 kerosene and you are saying RPX. Is that just a different grade than maybe the other companies use?

Carolina Grossman: Yeah, that is right. It is slightly different from RP-1 but we use RPX.

Thomas Burghardt: Got you. Next question from chat that says at T minus two minutes and counting, does the flight computer take over the countdown? Where does that occur?

Carolina Grossman: Yeah. So, one of my, I think, most exciting moments of the countdown is hearing it is at T minus 60 seconds. The call from our flight director will be that the vehicle is on internal control. And at that point at T minus 60 seconds, that is when the internal systems are now in command of the vehicle. And they will continue to command the vehicle through flight. So, there is no human input into the system during a nominal flight where our guidance algorithms and our flight software algorithms are in control of our rocket.

Thomas Burghardt: Yeah. And as we get further into the countdown, we will definitely highlight and explain some of those things as they happen, as of course, that is a later in the countdown issue. But we are going to keep them coming here.

Next question from chat says, will there be any other versions of this rocket?

Carolina Grossman: Well, certainly for tonight, we are focused on the launch of LV0007. And as we mentioned a little earlier, our goal is to reach daily space delivery and offer rocket launch every day. So, Astra has many future plans. You can learn more about them by following us on Twitter or checking out our website, Astra.com. And as a public company, we also provide a lot of future information in our SEC filings. But for tonight, we will be focused on LV0007 and our mission to reach orbit.

Thomas Burghardt: All right. Speaking of reaching orbit, we got a question here from Avenger asking, why fly from Kodiak when it is harder to reach orbit because it is so far away from the equator?

Carolina Grossman: Yeah, that is a wonderful question. So, first of all, I just want to shout out our wonderful partners at the Pacific Spaceport Complex – Alaska and we really enjoy working with them and very glad to have launched out of there and we will continue to launch out of Kodiak in the future. And really, the choice of the launch site is partially determined by the mission. So, tonight's mission for the Space Force is heading to an inclination of 86 degrees, which is a favorable location to reach from Kodiak. Kodiak is great for reaching polar and high-inclination orbits, which are common for earth observation missions. And otherwise, launching from the equator is typically very common because that is where earth's rotation is the fastest so you get a boost that helps rockets reach orbit. But there are many different reasons for selecting a launch site. And in this case, launching from Kodiak is actually very favorable for the mission.

Thomas Burghardt: Yeah. From a physical perspective, you can actually say that when you are launching to a near-polar orbit or a high-inclination orbit like this mission, it actually hurts you to be close to the equator because you do not want that velocity. So, before getting too much into orbital mechanics, I do not want to make this a physics lecture or anything but it is all about what orbit you are going to and it is very interesting.

Carolina Grossman: Yeah, that is right. And I think just to quickly highlight a few other things that are great about launching out of Kodiak is, it is a little hard to see right now but during the daytime, you would see we have a beautiful view and this launch pad is right on the ocean. So, launching over the water makes it obviously easy to keep away from populated areas. We work with the Coast Guard and FAA to make sure that there are no boats or planes in the vicinity and ensure safety is our top priority. But the location near the water also makes Kodiak a great choice for launches.

Thomas Burghardt: Yeah. You cannot see the ocean in this particular camera view but you can see the lack of lights around the launch complex, which means there is nothing else out there. You got plenty of room to yourself. There is a map of the actual launch trajectory like the hazard zones that go around the planned trajectory for this launch. So, you can see flying south from Alaska towards a near-polar orbit. And you have all that room and all that ocean out there to make sure that the launch is conducted safely. And that is, of course, very common for launch sites. Most launch sites could launch over water or over uninhabited desert. That is the safest way to ensure that falling stages or any mishaps during launch do not affect public safety and that is very common. The next question, are there any advantages to launching at night?

Carolina Grossman: Yeah. So, the choice of our launch window is really determined by working with the FAA and make sure that we are minimizing the impact to air travel and marine traffic. So, due to Kodiak's proximity to Anchorage, Alaska, which is a very, very busy airport and our upcoming busy holiday season for shipping, the night window was determined to be the option that we had for this mission. Some other reasons for the choice of a launch window maybe is due to the specific objectives of the satellite or the precise orbit where the payload is seeking relative to the position of other satellites already in orbit and, of course, being able to avoid other objects on orbit such as the International Space Station.

Actually in this case, one advantage of launching at night is you actually get a really great view on a clear night. I think the rocket plume makes a beautiful and very visible streak across the sky. So, hopefully folks who are within range of that trajectory to be able to see it visually will have a great view this evening.

Thomas Burghardt: Yeah. I do have one question from Jenny asking if it would be visible from North Carolina. Probably too far away there, right?

Carolina Grossman: That is probably a little too far, although you will get a great view from watching our live stream.

Thomas Burghardt: That is true. That is the best view, right?

Carolina Grossman: Front row seat.

Thomas Burghardt: Got you. In the mean time, again, if you have more questions, please tag us with @NASASpaceFlight in chat. We are going to keep bringing those in over the course of broadcast. We also have some other cool stuff to show you. We actually have a little bit more from our NSF factory tour to show some bits about how they weld this rocket together and some cool manufacturing stuff. So, let us look at that really quick.

[Video Presentation]

Bryson Gentile: So, this is what we call our circumferential tape welder. Essentially, what happens on this machine is we will bring a dome in here. We will chuck up a dome and we will add a barrel section. And this machine is automated. You basically give it – tell it which weld you are running. It positions everything for you, lights a torch and it will zip a weld all the way around the circumference. And we just keep adding barrels until we close out and add domes. We basically just grow a first stage tank on this machine.

Thomas Burghardt: Okay. And I know the stage is on like a three and going forward, they are going to be – being stretched a little bit, right? Are there changes to the barrel sections and the domes that need to happen for that or is that simple as let us just add more barrel sections?

Bryson Gentile: From a high level, basically it is as simple as add more barrel sections. We had package projected for a longer rocket with extra rails on this machine in particular. And there is a limit to how much you can do there because you need to start optimizing around buckling stability of your tanks and what pressure you operate the tanks at. And you end up with a bunch of different trades as you change the aspect ratio of the rocket and the skin thickness and whatnot, so. But we package projected early on enough that that was not a difficult change for us to accommodate.

Thomas Burghardt: Got you.

Bryson Gentile: So, our tanks use two different weld processes. We do friction stir welding for longitudinal seams that go up the raceway or the raceway access. And then we use TIG for the circumferential seam. So, if you are up on your pressure vessel math, you will know that hoop stress is exactly double the axial stress of the cylindrical pressure vessel. So, you need double the weld performance on that linear seam.

Thomas Burghardt: Right.

Bryson Gentile: So, we use a friction stir weld there that has really high weld performance greater than 80 percent parent material strength coming out of that weld. And then we use a TIG weld for where we do not need it, which is roughly 50 percent parent material strength, right, order of magnitude.

Thomas Burghardt: What are the benefits to doing that and just not doing friction stir welding everywhere?

Bryson Gentile: Yeah. Friction stir welding is actually super complicated to do circumferentially. It is actually quite simple to do linearly, right? So, we do friction stir welding where it is easy and simple and then we do TIG welding where we do not need the complicated process. So, we do that TIG on the circumferential seam because it is a very, very well developed process, super easy. We do not need any reaction anvils on the inside of the friction stir welder, no crazy stuff going on here, just pretty simple methods.

Thomas Burghardt: Got you.

Bryson Gentile: One of our values here at Astra is simple scales. So, we try to choose the simple way to problem solve. For me, if you are solving a problem and it looks complicated, you should be asking yourself a question about am I solving the wrong problem? And can I look at this in another way that actually makes the answer simple? It is a common thing that you are taught when you are going through engineering school. Like, yeah, there are many ways to go about answering problems and some are much simpler fundamentally than others if you take the right approach. So, we definitely try to choose wisely when we are going to apply the right technique.

Thomas Burghardt: Okay.

[End of Video]

Thomas Burghardt: Again, super cool to get a tour of the factory here at Astra. And if you want the full version of that, please check it out on NASASpaceFlight's YouTube channel. In the mean time, we are still on that T minus 30-minute hold but I have got a new guest here. Chloe Song is an embedded software engineer here at Astra. Chloe, thanks so much for taking some time to join me today.

Chloe Song: Yeah. Thank you so much for having me. It is a really exciting time to be here.

Thomas Burghardt: Absolutely. Just going to talk about what is your job and your responsibilities here at Astra as an embedded software engineer?

Chloe Song: Yeah. So, like you mentioned, I am an embedded software engineer on the avionics software team. And our responsibilities are to develop and test the flight software that go on the rocket. So, things like our guidance computer, our GPS, our radios, anything with a microcontroller on it really, we are developing that code.

And another big part of what we do is to test that and validate the software changes that we make. So, we have what we call a hardware-in-the-loop simulator, our 'mock-it'. And that's really cool because it contains all the avionics, our harnessing, a lot of sensor simulation, GPS simulation, all that. So, it basically acts like a rocket that is flying. So, any time we do make a software change, we can then validate that and run like a full mission simulation and make sure that the expected outcome does actually happen and we can catch any bugs in the software.

Thomas Burghardt: Wow, that was very extensive. That is a lot of stuff there. What part of that is your favorite part of what you are doing here at Astra?

Chloe Song: Well, I mean, the cool thing about Astra is that no matter what you work on or touch, right, it is either going to go on the rocket or it is going to help us launch. So, you really have an opportunity to make such a big impact here and as an engineer, that is always really exciting to me. So, yeah, I think just knowing that I am writing software for the rocket and it is going to fly, I mean, that is really cool.

Thomas Burghardt: That is really cool. The whole Astra motto here is around simplify to scale and things like that. How does that philosophy apply to avionics and electronics design?

Chloe Song: Right. So, our simplify to scale philosophy is really about balancing quality, overhead and scalability. And so, when we are designing hardware or software, we have to constantly think about, okay, what is the simplest version of this that we can deliver to get us to our result in the quickest way possible but also allow us to go back and add features and iterate on that in an easy way?

So, with printed circuit boards for example where you place a connector on a PCB, it can actually affect what the enclosure design looks like.

Thomas Burghardt: Okay.

Chloe Song: And the enclosure design can affect how the sub-assemblies team is putting stuff together. And even down to like integration when we are putting something on the rocket, if something is like really difficult to put on there, that can be a big time sink for us. So, any time savings with manufacturing and insulation that we can make, we are constantly thinking about that.

Thomas Burghardt: Interesting. And that must be really involved with the testing process too and iterating from that perspective.

Chloe Song: Right.

Thomas Burghardt: What does that testing process look like for the electronics?

Chloe Song: Right. So, we sort of go through two test processes. One is qualification and the second is acceptance testing.

Thomas Burghardt: Right.

Chloe Song: So, the first is qualification testing. And when you have a new design, you have to verify that that is going to survive a launch, right? You cannot just put a board on the rocket and expect it to go through all that vibration and thermal cycling and work. So, we actually have a lot of that test equipment in house. So, we do vibration testing, thermal testing. We have a thermal vacuum chamber that we use. And that gives us confidence that our products will survive a launch.

And so after that, once you have a qualified design, you go into acceptance testing and production. So, when we do get a batch of circuit boards back, we cannot just put that on the rocket either. You sort of have to verify and do like a baseline functional testing and make sure that you are measuring the right voltages, your communication buses are all working at full speed, things like that. And that is sort of the last gate before delivering a flight-ready unit to the rocket.

Thomas Burghardt: Got you. And then I always like to ask about the human side of things. We talked a lot about hardware and software, of course, with the avionics team but the human element is something that I think is really exciting to just learn about here at Astra. You got a lot of different backgrounds and things.

Chloe Song: Right.

Thomas Burghardt: What kind of roles make up the avionics team here?

Chloe Song: Yeah. We have a bunch of roles. There are more embedded software engineers like myself. We have an awesome group of electrical engineers, GNC engineers who are basically celebrities after the last launch.

Thomas Burghardt: Yeah.

Chloe Song: But we are also hiring. We are hiring for experienced RF engineers, antenna engineers, avionics, electronics technicians. So, I would encourage anyone who is listening or are viewing our livestream to go to Astra.com/careers and see what is out there, whether or not anything I mentioned is relevant or not. I think we have over a hundred job postings on the website now. So, we are definitely ramping up hiring.

Thomas Burghardt: Every time we come here, the number of employees keeps increasing.

Chloe Song: I know.

Thomas Burghardt: So, they are definitely growing and that is super cool to learn about and hear about. So, Chloe, thank you so much for taking some time to do some Q&A with us and good luck with the launch today.

Chloe Song: Yeah. Thank you so much. Thank you for having me.

Thomas Burghardt: In the mean time, we are still on this hold at T minus 30 minutes. Again, teams are working on completing propellant load operations. We will have more information and hopefully a new T-zero before too long and we will share that as soon as we have it. In the mean time, let us go ahead and listen in to the countdown net and the microphones out at the pad as we wait for this hold to clear.

[Countdown Net Footage]

Thomas Burghardt: And welcome back again. We are still on this T minus 30-minute hold. The teams are still working that. Of course, they are working on backroom nets and stuff. So, the countdown net, it has actually been pretty quiet. We got those microphones out at the pad but no countdown chat, right, countdown net chat right now. But we are going to dive back into Q&A so, again, if you have got questions about the launch, please tag us with @NASASpaceFlight. We are going to keep those going here. The next question from chat from Steven asking, could you explain the process of preparing the rocket for another launch after a scrub?

Carolina Grossman: Sure. So, last night after our scrub, we first removed all of the – detanked all of the propellants from the vehicle. We bring the vehicle down. That is one of the first steps in our countdown procedure is to lift the vehicle vertical. So, we bring the vehicle down. We conduct any inspections. We review any items that came up during the launch attempt. So, again, in the case of last night's scrub, the issue with the ignitor system, came up with a mitigation plan for that and implement that fix and get a good night's sleep and go again.

Thomas Burghardt: Sleep is very important, of course. The next question from chat, Ernest asking why the launch suppression, the water system sprays away from the rocket during launch.

Carolina Grossman: Yeah. So, what is most visible is the outward plume but we actually do also have part of the system that sprays in towards the system. During the water deluge, we mostly want to make sure that we do not get any fire or anything on the ground. We do not want to get water into our systems immediately in the seconds before launch. But in the event that there is a fire in the launcher, we do have a portion of that system that is directed directly at the launcher as well.

Thomas Burghardt: Got it. Our next question from Tara saying, does Astra have any dedicated launch photographers? Definitely my dream job right there. Sorry, that was from Josh. So, thank you, Josh. I believe I can actually take that one because a couple of friends that you may have heard of on NASASpaceFlight broadcasts before have done some photography with Astra, our good friend John Kraus, our good friend Brady Kenniston, if you are familiar with NSF's coverage, you have seen their names before. We have seen them out there in Kodiak so some familiar faces and some familiar names with the launch photography here.

Next question, Zag is asking, is there a flight termination system on the rocket?

Carolina Grossman: Yeah. So, we do have a flight termination system on the rocket. I will go through our mission control operators and one of those folks, Lucas Hundley is our flight safety system operator and making sure that if in the event that the vehicle is going off course, we can make sure that there is no bad outcome. So, we do have a flight termination system on the vehicle. In our case, it commands the first stage engines to shut down the vehicle and the flight.

Thomas Burghardt: And that is different because some FTS systems are more destructive. They actually terminate the rocket by blowing it up basically versus thrust termination.

Carolina Grossman: Right. So, because our vehicle is so small, we do not need to use that more explosive system. We can instead command the vehicle to shut down the engines. And we ensure that this is done within our trajectory, within our safe zone. So, that should be, everything should be clear in the event that the flight needs to end early.

Thomas Burghardt: Yeah. Next question from chat, question, how much time does it take to roll out the rocket and set up on the launch pad?

Carolina Grossman: Yeah. So, we can set up a launch pad in a number of days. This is a great view of our launch pad. You can see one of the shipping containers sort of near the bottom of your screen. But pretty much, everything that you see in front of you except for the large tent and the fence and some of the fixed infrastructure there does fit in standard shipping containers and goes over trucks and boats and occasionally even aircraft to make it to the launch site.

And our red team, a team of handful of folks that accompany the rocket and the ground support equipment to our launch site, will set up the launch pad in a matter of days.

Thomas Burghardt: Next question, let us see, what things do you need to take with you to the launch pad? So, relevant question there.

Carolina Grossman: Yeah, great related question. So, we bring pretty much everything that you see with us. We bring, of course, the rocket, the launcher that you see which is the black launch mount sitting underneath the rocket and the long arm. That's the strong back. We bring those with us. We also bring containers, which help us pump the propellant through the system and we bring pretty much everything we need.

So, we pride ourselves on having a fully mobile system and really, all we need at a launch site is a concrete pad and an internet connection and we can set up a spaceport.

Thomas Burghardt: Very cool. The next question here, how high will the orbit be tonight? So, orbit are we targeting tonight?

Carolina Grossman: Yeah. And we can talk a little bit more generally about the mission objectives but we are heading for an orbit of 500 kilometers and an inclination of 86 degrees. The payload we have onboard LV0007 is a mass simulator for the United States Space Force and that camera view will show these lights will light up as we send a signal to simulate payload deployment, again, because the payload is a mass simulator. We will not actually be deploying it. And this is the United States Space Force second mission, STP27AD2, which is intended to demonstrate Astra's ability to deliver for the Department of Defense.

Thomas Burghardt: Got you. And this is more or less a kind of a redo of the previous launches, just aiming to demonstrate that orbital capability with a mass simulator on board.

Carolina Grossman: Right. That is right. Our main goal tonight is to reach orbit.

Thomas Burghardt: Got you. Next question, let us see. How visible will the aurora be during stage separation? Maybe talking about the rocket exhaust there or maybe aurora. I do not know. What do you think?

Carolina Grossman: I do not know but that is a wonderful question. And I personally think it would be really cool to see the aurora during tonight's flight. I can tell you with our 3.2 launch in December of 2020, we were all so focused on seeing that beautiful ignition of the upper stage engine and watching those milestones that I do not think we would have noticed the aurora.

Thomas Burghardt: Sure.

Carolina Grossman: But it might make for a cool view tonight. We will just have to wait and see.

Thomas Burghardt: And speaking of the cool views, we got another question in chat and I am going to tee up Michael Baylor for this one, will there be any cameras on board the rocket for this launch? We caught a glimpse of one with the fairing earlier. Right now, we have got a bit of a fogged out view from one of the first stage cameras looking down the side of the rocket. But there they are hopefully looking to come back to those views once the rocket is flying through the air hopefully later tonight. There is one from the upper stage. That is the upper stage still sitting in that payload fairing. That is a little bit different for Astra's rocket, right, that stage? It actually sits in the payload fairing with the payload?

Carolina Grossman: That is right. A large portion of the upper stage is encapsulated by the fairing.

Thomas Burghardt: And there is another view. That is looking down the second stage, right? That is like the second stage bottom of the tank and the nozzle, right?

Carolina Grossman: Yeah. I think I see. It is kind of a dark curve shape in the middle. That would be the nozzle extension of our upper stage Aether engine.

Thomas Burghardt: Shout out to Mr. Michael Baylor showing off the onboard camera views there. The next question in chat, what fuel does the second stage use and what engine?

Carolina Grossman: Yeah. So, both of our stages use the same propellants, which is liquid oxygen and RPX, which is essentially kerosene. And our second stage engine that we were just talking about is we call it Aether. It is designed and built and tested all in house just like our first stage engines. The Aether engine produces 740 pounds of thrust. And it is a pressure-fed engine. So, our first stage engines are electric-pump-fed engines; Aether is a pressure-fed engine.

Thomas Burghardt: The next question here asking, what does their flight software testing process look like?

Carolina Grossman: Sure. Well, I think Chloe, our embedded software engineer, talked a little bit about the testing process during her interview but I will just recap some of the things that we do. We have a simulator that we call the mock-it that we use for a lot of our simulations.

Thomas Burghardt: Great name by the way.

Carolina Grossman: Yes. It is a pretty good one. So, the mock-it, it is pretty cool. It is all of our avionics and our harnesses and everything sort of laid out to really simulate all of our systems in a pretty robust way. And we are constantly testing and updating things. We do a lot of automated testing and we are, of course, getting the latest wind information during our countdown and we run simulations and incorporate that data into our latest and greatest flight trajectory immediately before launch as well.

Thomas Burghardt: Got you. Another question from chat, again, if you have questions, please tag us with @NASASpaceFlight and keep bringing those in. We are going to keep asking them. And the next one asking, what is Astra's current production rate?

Carolina Grossman: Sure. This was actually a similar question that we had from the Alameda Boys & Girls Club yesterday about how long it takes us to manufacture the rockets. So, we just want to shout out to the kids at the boys and girls club down the street from our headquarters here in Alameda.

And right now, it takes us a few months to build each vehicle. And we are gradually ramping up and working towards that goal of delivering a rocket every single day. Of course, it may not necessarily mean we build a rocket in a day but have the capacity to deliver a completed launch vehicle on a daily basis in the future.

So, some of the ways that we stand out from the competition, I think, is using simple material, using tried and true processes, using as much automation as we can in our systems to simplify and really stand out as working towards building to scale.

Thomas Burghardt: Got you. Again, if you are just joining us, we are still in a T minus 30-minute hold right now. The teams are currently working through finishing propellant loading operations but I think we can take that opportunity to actually look at the different roles in mission control. Here is actually a view of mission control here in Alameda, California. And Carolina, can you talk us through who we are looking at what the jobs are?

Carolina Grossman: Yes. So, we will start with Chris Hofmann who is our flight director. He is responsible for overseeing and directing launch vehicle operations per the countdown manual with the authority to call hold, recycle or abort as required. And as a fun fact, Chris Hofmann also runs Rocket Cat Rescue on the side. So, if you are looking to help some kitties in need, check that out.

To his left, with the googly eyes on his console, is Thomas Arend who is our flight activities officer or FAO. And so, he is responsible for documenting all of our operations as they happen and making a note of any future after items that need to occur after the fact.

Continuing clockwise, we have Chris May who is command and data handling or CDH. And he monitors and adjusts state machines as needed under a command from the flight director.

Then Joshua Green is our vehicle controller with the call sign of Tango. So, you will hear a lot of him as we listen in to the countdown net. He operates the terminal control in the vehicle's system under the direction of the flight director.

Then Dan Wilson, GNC and trajectory or the call sign GNC, he ensures weather and wind trajectory information is up to date, properly loaded and meets flight criteria and also wears really great sweaters.

Thomas Burghardt: He also has the joystick on his desk, which is, of course, very important.

Carolina Grossman: Yes, a very important joystick that does not actually do anything but is very important. And then Lucas Hundley, flight safety or call sign FTS. So, he is responsible for making sure that the vehicle is on the trajectory and calling the flight safety system should it not be following its planned path.

Thomas Burghardt: Got you. And so, those are most of the call signs that we will hear on the countdown net although there are also a few others, right?

Carolina Grossman: That is right. So, our mission control, as you can see, is a very small group of folks. But you may hear other call signs as we got into the go and no-go polls and those are what we call the engineering backroom, which are the engineers who are responsible for the different systems on the rocket.

So, ACE is our ground software system. Tango is our radio system. Odin is flight software. Delphin is our first stage engine. Aether is our upper stage engine. Booster is the first stage system. Orbit is the upper stage system. Launcher is in charge of the ground support equipment. And Panther is the backroom coordinator. So, you may hear those call signs as we continue to listen to the countdown and then you will hear those during the go/no-go poll as well.

Thomas Burghardt: And on top of all those folks who are working here in Alameda, we also got the skeleton crew that is out there in Alaska. And we mentioned them earlier about the red team doing their work. Can you talk a little bit about what the heck the red team is?

Carolina Grossman: Yes. A huge shout out to red team who is out there in these cold conditions making sure that our vehicle and systems are a go for flight. So, starting off with our red lead Adam Fritsch who is responsible for all the activities and the safety of launch-pad-related operations. Then we have a few pad technicians who are Hill Hudson, Robert Freeman, Eric Larsen and Sam Hearsharp. They operate the hardware hands on, on the ground before the remote systems take over. So, they are the ones making sure that everything is set up.

We have our IT or red wire, who is Eric Steinberg. We call him 'Steiny'. And so, he is a specialist in our IT systems and AV. And we have to be very thankful to him for the great broadcast that we are having this evening as well.

And finally, our safety lead is Ryan Hirschfield who is responsible for the safety of overall launch operation events including personnel compliance with our safety policies and procedures, which is really important. So, again, I want to give a huge shout out to our red team who are out there in the cold and dark. We are very grateful for the hard work that you do.

Thomas Burghardt: Absolutely, a very cool team out there and it is cool to see them work. In the mean time, those teams are still working a hold. We are at T minus 30 minutes and holding. Propellant loading is just finishing up still and the teams are working on that. As soon as we have a new T-zero, I will share that with you as soon as we can. But in the mean time, let us go ahead and listen in to the pad mics as the rocket sits there and gets fueled up and we will bring to you some more information as soon as we have it.

And again, we are still holding at T minus 30 minutes and holding. However, we are getting close to resuming that count and once we have the firm new T-zero, we will go ahead and share that with you. We will do a little bit more Q&A but once the countdown resumes, the countdown is going to get pretty chatty and we will go ahead and listen in to that because that is always cool. But again, getting close to resuming the hold. Once we have a new T-zero, I will share that.

In the mean time, let us go ahead and do some more Q&A here. The next one, let us see, how does fuel get into the rocket?

Carolina Grossman: Sure. So, you see that the fuel is pumped into the rocket through our launcher system and the ground support equipment that goes with it. So, you may be able to see some of those long hoses on the ground. You can see this black sort of support structure that the rocket is sitting on, that is our launcher and it is actually a really complex piece of equipment. You can also see the lines that connect the upper stage to the strong back, that long arm that is leaned back. And so, those are some of the lines that pump the propellants into the vehicle.

Thomas Burghardt: Next question here, let us see, Shannon in chat says, we are all familiar with the wildlife that Florida fondly calls KSC security – there are gators out there, of course – what sorts of wild visitors do you get in Kodiak?

Carolina Grossman: Yeah. So, there certainly are bears out there. I do not think we have seen any recently but I think the red team in the past had seen plenty of deer and moose and things like that. And during this launch campaign, there has been a friendly little fox that has been roaming around as well, which has been a nice thing to see. But of course, we work with the ranch and make sure that things are as clear as possible and as safe as possible before we begin our launch operations.

Thomas Burghardt: The next question from chat says, what is the latest time that Astra can launch in today's launch window?

Carolina Grossman: Sure. So, we do have about two and a half hours remaining in our window. Our window closes at midnight Pacific time. So, we actually have plenty of time in our window remaining for launch tonight.

Thomas Burghardt: Okay. And again, if you are just joining us, we are still T minus 30 minutes and holding. And we are waiting for a new T-zero but hopefully getting close to that information being with us here. The next question from chat though in the mean time, Kenny asks, is Astra going to de-orbit the payload?

Carolina Grossman: Right. So, today's flight is a test mission. So, the payload that we have is actually just a mass simulator. So, it will not be deployed during this mission. So, there will not be any need to de-orbit it. The first stage will de-orbit, will burn up in the atmosphere with the payload attached to it. We will be sending a signal to simulate the deployment and make sure that everything would have a work nominally had we had a non-mass simulator payload aboard the rocket today.

Thomas Burghardt: So, just to clarify, the upper stage and the payload still attached will both destructively reenter safely and mitigate space debris and things like that.

Carolina Grossman: Right, exactly. We consider that to be very important. We want to be responsible stewards of space. And our mission is to improve life on earth from space. And one of the ways that we think is important to do that is by making sure that we use space responsibly and aren't creating a bunch of space debris.

Thomas Burghardt: Got you, absolutely. The next question from Quinn asking, will Astra ever have a need for civil engineers?

Carolina Grossman: You know, Astra has needs for all kinds of engineers. I think that is one of the most exciting things about working here and one of the things that makes us unique is we have folks from all sorts of different backgrounds. And we have a lot of obviously specialists in aerospace engineering and propulsion but many of our team come from automotive backgrounds, from different startups and companies around the Bay Area where we are located. I, myself, have a biomedical engineering background. So, you can check out our careers page on Astra.com and see the types of opportunities we are hiring for. But we like to have a diverse set of backgrounds because it helps us build rockets differently.

Thomas Burghardt: All right. A related question here in chat, what is the difference between the machine shop, the production team and the engineering team?

Carolina Grossman: Sure. That is a great question. So, the engineering team, they are the team that is really working on the design of the vehicle and designing all of the components. The production team is responsible for building the rocket and taking those designs and making them into a reality. And then we have an in-house machine shop, which is sort of part of our production team. And a lot of what you see on our vehicle and on our launch system does come into our factory as raw material, as sheets of metal and our in-house machine shop turns them into the finished product that you see today and all of these teams work very closely together. We are all trying to build for scale from the onset and so it is very important for our engineering team to consider, you know, how are we going to make not just one of this part but how are we going to make tens and hundreds of these parts so that we can scale up our production.

Thomas Burghardt: The next question from chat says can a manual abort be issued one that is under 10 seconds from lift off?

Carolina Grossman: Yeah, so an abort can be called at any point in the countdown and so, you know, as mentioned earlier that the vehicles is on its internal control in those final seconds leading up to launch but an abort can be called at any point and the system can also use its own sensors and checks to abort immediately before launch. So, there is always a way to hold off and to stop the process as well.

Thomas Burghardt: That is great. If you have any questions about the launch, what you are seeing, what we are talking about, please, go ahead and throw those in the chat and if you tag us with @NASASpaceflght, we will be able to see them and we will bring them in and we are going to keep asking those over the course of the broadcast. We are still waiting for this hold to clear, hopefully, getting there soon. We are at T minus 30 minutes and holding. Once that hold is released, we should have a new T-zero for you, the targeted lift off time and as soon as we have that we will share it but in the meantime, team are still holding and we will have a new T-zero. Like Carolina said the launch window extends another hour and a half or so – I'm sorry two hours, two and a half hours. I can't do math in my head. My apologies. Two and a half hours.

Carolina Grossman: Yes, yes. We have quite some time remaining.

Thomas Burghardt: The next question from Sam says how will Astra manage countdowns and what? Sorry, let me rephrase that. Okay, we are just getting word, sorry. Getting interrupted because we have new news. We are getting ready to resume the countdown, a new T-zero on the way 0534 UTC. So, looks like we should resume the count in just about a minute. Let's go ahead and listen in to the countdown now as that occurs.

Speaker: This is flight on countdown Astra is resuming count at this time. First up, 106 FTS Fair Fight, mission data load values are ready to be loaded onto the AFTU. We are on Cast software as required.

Speaker: Cast software is running. AFTU is green.

Speaker: Safety, confirm that you have all Astra employees and guests in Kodiak accounted for.

Speaker: Safety can confirm.

Speaker: And all personnel are in a safe location?

Speaker: Correct. We have two individuals at AMC.

Speaker: TNC, Fair Fight forming, we are still green on [inaudible] with a 604 time and still green on blackout avoidance.

Speaker: Confirm, green [inaudible] and blackout avoidance.

Speaker: RCO, flight on countdown at this time. Astra requests power on transmitter and an able [inaudible].

Speaker: This is RCO. That is inward. Flight, this is RCO. We have a carrier up and monitor up.

Speaker: Copy that. Safety verify signal strength and good power up.

Speaker: Safety can confirm.

Speaker: Tango and AB1 Rocket Support Cart, please enable the FTS.

Speaker: FTS is enabled.

Speaker: Safety verify FTS is enabled and nominal.

Speaker: Safety can confirm.

Speaker: RCO, flight on countdown at this time. Astra FTS is enabled on the vehicle.

Speaker: RCO copies.

Speaker: This takes us to final software load. Tango and Machine, pump battery two, manage pump battery charging, please set us to mode two. Stop charging pump batteries.

Speaker: Mode two charging has stopped.

Speaker: And AV1 manage power systems toggle off, guidance power system authority.

Speaker: Guidance power system authority off.

Speaker: In AV1 manage polling, toggle, do only ground polling.

Speaker: Do only ground polling, on.

Speaker: First step 120. Tango, are you ready to load new late load configs?

Speaker: We are standing by for late loads.

Speaker: Go ahead, Delphine.

Speaker: Igniter, controller, config is 154, Victor 1.

Speaker: GC ignitor 154, Victor 1. Good load.

Speaker: Engine Alpha is 155, Victor 18.

Speaker: Engine Alpha, 155 Victor 18. Good load.

Speaker: Engine Bravo is 156, Victor 15.

Speaker: Engine Bravo 156, Victor 15. Good load.

Speaker: Engine Charlie is 157, Victor 15.

Speaker: Engine Charlie 157, Victor 15. Good load.

Speaker: Engine Delta is 158, Victor 18.

Speaker: Engine Delta 158, Victor 18. Good load.

Speaker: And Engine Echo is 159, Victor 16.

Speaker: Engine Echo 159, Victor 16. Good load.

Speaker: Ether, please provide your late load config.

Speaker: Ether late load config, 163 Victor 11.

Speaker: Ether controller, 163 Victor 11. Successful load.

Speaker: GMC, please provide your late load config.

Speaker: We are loading 5 Victor 137 L4 configuration.

Speaker: 5 Victor 137, GNC Kodiak launch config. Successful load.

Speaker: Alright, Tango, in VB1, turn off PVs. Please run a GNC set up.

Speaker: GNC set up, on.

Thomas Burghardt: Again, as you have seen, they are working through some edging configs because we are back into the countdown. T minus 25 minutes or so and counting. Our new T-zero is at 10.04pm Pacific time or 6.04am UTC and the countdown is proceeding.

Carolina, where are we doing right now in the countdown?

Carolina Grossman: Sure. So, the next stop in the countdown is we are going to spin up the pumps of the first stage engine. It is one of our final checks and we are well on our way to our T-zero time in just 24 minutes.

Thomas Burghardt: We are going to keep listening in to the countdown, Ned, as those milestones get ahead. You can hear the mission controllers in the back room, engineers working through all the final preparation for launch so we will listen in to that. We might have a little bit of time for Q&A so if you have more questions, please throw them in the chat. We might come back to those in a little bit but right now let us focus in on the countdown as it progresses again. New T-zero of 10.04pm Pacific, 6.04 UTC.

The countdown has been a little quiet but the teams are still progressing through their milestones and, of course, every time I keep saying let’s go to countdown they get quiet. It happens sometimes but we are at T minus 23 minutes and counting and everything proceeding normally right now. Let’s go back into some questions here and Sam in chat asks how will Astra make its countdown and launch schedules with daily launches? It seems like small delays could hold up many launches.

Carolina Grossman: That is a fantastic question and I very much look forward to having those problems. Those will be good problems to have but we are focusing tonight on our launch of LV0007 and so you could keep your eyes posted on our future plans by following us on Twitter and checking out our website Astra.com where we will be sharing more information about our future plans.

Thomas Burghardt: Alright. Next question, what are some of the metrics that Astra is expecting to gather from this flight?

Carolina Grossman: Yeah, we get data from all different aspects of our system. Some of the things that we look for is, you know, the health of our launcher and of our grand systems. We also get a ton of data from really every part of the rocket that we are looking to verify tons and tons of data that our engineering teams will then review after the flight and we will use to learn and iterate and make improvements to the vehicle but the most important objective that we are hoping to achieve tonight is reaching orbit and, again, simulating that signal for pay load deployment for the mass simulator that is our pay load for this evening's mission.

Thomas Burghardt: Speaking of payload, I got a question in chat from Brody asking if the white area on top is a larger faring or just the very tip? Can you just talk us, what we are looking at right now because there's tanks, there's frosty tanks and there's the white part on top? What are these different components?

Carolina Grossman: Sure. Maybe, we can bring up. We have a graphic to, sort of, show the different parts of the vehicle that we can maybe bring up but [BREAK IN AUDIO] bottom of the first stage and then we will work our way up the rocket. So, first, you can see, we have our first stage Delphine engines. Those are electric pump-fed engines that each produce 6,500 pounds of thrust. You can see, sort of, three of them peeking out from under the engine bay but we do have five of them on the first stage and then they are attached to that engine bay segment which contains the pumps, the electronics and the plumbing needed to run those engines. Moving up to the right is the first stage that is the largest segment of the vehicle and that is the propellant that powers those Delphine engines. Both stages are full of liquid oxygen and RPX which, essentially, kerosine and then the, kind of, cone-shaped section, that is the inner stage. That contains a lot of the avionics of the vehicle and also is where the nozzle extension of the upper stage Aether engines, sort of, fits in snuggly and then looking to the right, the upper stage, that, sort of, dark triangle shape, that is the bottom portion of the upper stage Aether engine which produces 740 pounds of thrust. It is a pressure-fed engine and there is one of those on the upper stage and you can see the two cylindrical, spherical tanks – excuse me – the two spherical tanks on the upper stage that are again liquid oxygen and RPX with that payload adaptor plate on top. Finally, the two halves that you see above and below the upper stage, those are the fairings which are in two halves which come apart in order to install that payload on top of the upper stage.

Thomas Burghardt: That is a list of all the different components and then when it gets all fueled up, we have this extra, kind of, confusing bit because it gets frosty near the top of the first stage and that is the liquid oxygen tank, right?

Carolina Grossman: Right. That's right. So, you can see now if we go from the top, you can see the fairing is, kind of, that curved upper portion that has the that triangle sticker, that is the Space Force logo and then the portion that has the star, the Astra logo, that is the inner stage, that cone-shaped portion and then the part that has, kind of, you know, the steam and the ice on it, that is the top portion of the first stage. So, you can see that, you know, the first stage is really the majority of the length of the rocket.

Thomas Burghardt: Of course, the top portions are the only painted versions. We got that nice bare aluminium down the side of the first stage engine which, of course, gets covered up in frost. You might not even be able to tell once it is fully fueled but the reason that not the whole first stage is like this because only the liquid oxygen gets cold enough to condense the air around it. The kerosene is at ambient temperatures, right?

Carolina Grossman: Yes, that's right. So, the liquid oxygen is very, very cold and what you are seeing is that ice forming on the outside, kind of, similar to the condensation forming if you are having a very cold drink on a hot day. So, it is the ambient air around it condensing and forming a thin layer of ice that does, you know, tend to fall off as the rocket proceeds through its trajectory.

Thomas Burghardt: Then what are all these vapors that we are seeing? We are seeing some around the rocket and also a bunch from the ground equipment around the rocket. What is that?

Carolina Grossman: Yeah, so those are, you know, vents to make sure that we are keeping the propellants at the appropriate temperatures, pressures, making sure that everything remains nice and full and then, you know, the, sort of, steam that you may see coming off the rocket that is just, kind of, that condensation on the outside of the rocket.

Thomas Burghardt: We are coming up in the point of the countdown at T minus 17 minutes and counting here. We are coming up on the water test. We will see the ground water deluge test. Now it should be pretty visible so let's go ahead and listen in to the countdown and listen in to the pad as that test comes underway.

Speaker: Tango, close water valve 100.

Speaker: Water valve 100 closed.

Speaker: Water valve 104 close, please.

Speaker: 104 closed.

Speaker: Thank you. Good water test. GNC also confirms good on winds.

Thomas Burghardt: As you just saw we had that water deluge test of the team continuing to work the countdown and everything appears nominal for an on time lift off. Again, the T-zero is currently targeted for 10.04pm Pacific time. That is just over 16 minutes from now and we are now getting close to entering the terminal count, I believe, is our next milestone, right, Carolina?

Carolina Grossman: That's right. So, that said, our T minus 15-minute mark is terminal count which is really our final checks of the vehicle and we can listen in. We will have a go, no-go poll very shortly to proceed into tank pressurization and launch.

Thomas Burghardt: Let's go ahead and listen back into the countdown as the Astra team get into terminal count.

Speaker: [Inaudible] GNC self-test, GNC call it upon completion with result.

Speaker: GNC self-test started. Self-test has passed.

Speaker: Copy. FTS, confirm that the FTS is still enabled the nominal in the vehicle.

Speaker: The FTS has enabled the nominal.

Speaker: Tango and fuel for operate, please toggle full.

Speaker: Fuel for operate, full on –

Speaker: And fast.

Speaker: Fast, on.

Speaker: Please let me know when you are ready to inspect the launch machine and set a new UTC T-zero time.

Speaker: Ackno-. Good. The said done.

Speaker: Tango, I'd like you to set a new UTC T-zero time with hours six.

Speaker: Hour six.

Speaker: Minutes four.

Speaker: Minutes four.

Speaker: Seconds zero.

Speaker: Seconds to zero.

Speaker: Please save and commit.

Speaker: Changes committed.

Thomas Burghardt: Alright, we are into the terminal countdown. Less than 14 minutes to go. Let's give a brief overview of what today's launch will look like. Carolina.

Carolina Grossman: Sure. A few seconds before lift-off, we will light the five first stage Delphine engines and the system will run checks to make sure that everything is nominal. If that looks good at T-zero seconds, we will release the hold down release mechanisms for lift off. A few seconds later the vehicle will begin its pitch over to continue its trajectory and after that, the next objective is max Q at one minute and 10 seconds after launch, a very significant objective and that is the point of maximum aerodynamic pressure on the vehicle. Two minutes and 50 seconds into the flight, we will have main engine cut off or MECO and then a few things happen in pretty quick succession. The fairings will separate and then five seconds later, the first stage and the upper stage will separate from each other and the upper stage Aether engine will light at three minutes and five seconds. It will run for a little over five minutes until we have second engine cut off or SECO at eight minutes and thirty seconds and then at eight minutes and 40 seconds, we will have the payload deployment signal. Again, we have a mass simulator as our pay load on this mission will not be deploying it but we will send that signal to simulate our deployment and if we will have achieved all of those steps, we will reach orbit and we will be very happy with the outcome of this evening's test flight.

Thomas Burghardt: Absolutely. Fingers crossed for a very successful test flight in just over 12 minutes from now, we are going to listen back in to the countdown that they are going through the final steps preceding the go, no-go poll for [inaudible]. Of course, if all systems are polled go we are into the business end of the countdown. So, let's listen in, 12 minutes and counting.

Speaker: Active.

Speaker: AV1 manage power systems.

Speaker: Active.

Speaker: All flight helium machines.

Speaker: ALM stack is up.

Speaker: PV1 first stage power.

Speaker: First stage power, active.

Speaker: PV1 upper stage power.

Speaker: Active.

Speaker: PB1 turn on, off PVBs.

Speaker: Active.

Speaker: Water 1, water system.

Speaker: Water 1 water system, active.

Speaker: This time tank I'd like you to active launch machine.

Speaker: Launch machine, active.

Speaker: Please toggle lock stopping.

Speaker: Lock stopping set to true.

Speaker: Okay, first step 150, the stakes is into the poll for tank pressurization and launch. After this point any system issue must be called as a three-word hold. If there are no concerns for flight call go, otherwise, call no-go. Red lead.

Speaker: Red lead is go.

Speaker: FTS.

Speaker: Go.

Speaker: Delphine.

Speaker: Go.

Speaker: Aether.

Speaker: Aether is go.

Speaker: Odin.

Speaker: Odin's go.

Speaker: INCO.

Speaker: INCO is go.

Speaker: ACE.

Speaker: Go.

Speaker: Launcher.

Speaker: Launchers go.

Speaker: Orbit.

Speaker: Orbit is go.

Speaker: Booster.

Speaker: Go.

Speaker: GNC.

Speaker: GNC is go.

Speaker: FAO.

Speaker: Go.

Speaker: CDH.

Speaker: CDH is go.

Speaker: Tango.

Speaker: Tango's go.

Speaker: Safety.

Speaker: Safety is go.

Speaker: Flight is go. Tango and AV1, manage polling. Please toggle do only ground polling.

Speaker: AV1 manage polling, do only ground polling, on.

Speaker: Delphine, are you ready to load sequences?

Speaker: Delphine's ready.

Speaker: Tango, are you ready?

Speaker: Tango standing by.

Speaker: Go ahead, Delphine.

Speaker: Igniter sequence is 703, Victor 3.

Speaker: Igniter sequence 703, Victor 3, slot zero. Good load.

Speaker: Engine Alpha is 821, Victor 3.

Speaker: Engine Alpha 821, Victor 3, slot zero, loaded.

Speaker: Engine Bravo is 822, Victor 2.

Speaker: Engine Bravo 822, Victor 2, slot zero. Good load.

Speaker: Engine Charlie is 823, Victor 2.

Speaker: Engine Charlie 823, Victor 2, slot zero, loaded.

Speaker: Engine Delta is 824, Victor 2.

Speaker: Engine Delta 824, Victor 2, slot zero. Good load.

Speaker: And Engine Echo is 825, Victor 2.

Speaker: Engine Echo 825, Victor 2, slot zero, loaded successfully.

Speaker: Astra's going to call a hold right now.

Speaker: RCO copies, we have a hold.

Thomas Burghardt: As you see, we are eight minutes and 30 seconds and hold and our hold has been called. Carolina.

Carolina Grossman: Yeah, as you can see there appears to be a valve stuck open near the base of the vehicle. It is one of our ground side valves that the team is working to cycle and get that fixed. If we do resolve the issue quickly which we hopefully will be, able to resolve then we would recycle the clock at T minus 15 minutes with a new T-zero time. So, we will provide some updates as soon as we have more information but, again, we are in hold.

Thomas Burghardt: Yes, are in hold and we will also share a new T-zero as soon as we have that information as well so standing by.

Alright, we are still in hold. However, those teams have been able to cycle that valve that we were looking and sounds like we are going to be ready to recycle to that T minus 15 point, the terminal count point and we will have a new T-zero here shortly.

Carolina Grossman: Yes, that's right. The teams were able to resolve the issue. You don't see any of the, sort of, cloud that was forming near the base of the vehicle and we believe we have addressed the issue. So, we will have an updated T-zero shortly.

Thomas Burghardt: Again, once we get back in to terminal count, the next big milestone is going to be after a couple preliminary steps, there will be the go, no-go poll once again to get back into the final 10 minutes of the count for they are going to recycle to the whole point of T minus 15 minutes to actually enter the terminal count and once we have a new T-zero, we will share that.

Alright, we are still in that hold but we are expecting a new T-zero shortly. The teams have been able to cycle that valve that we are seeing in the bottom of the launcher there and we are expecting a new T-zero shortly.

Carolina Grossman: Yes, that's right. The teams have resolved the issue so any moment now we expect to have an update T-zero and resume the countdown.

Thomas Burghardt: What we will hear on the countdown there whatever we will be able to listen into is them setting the new T-zero time and then the teams will go back into go, no-go polling to proceed with the launcher time. So, standing by for that T-zero call from flight director Chris Hoffman.

Speaker: It is flight on countdown picking back up. Tango, please let me know when you can deactivate and inspect the launch machine to update our T-zero.

Speaker: [Inaudible], deactivating launch machine. Inspecting, ready to set a T-zero.

Speaker: Hour six.

Speaker: Hour six.

Speaker: Minutes one six.

Speaker: Minutes one six.

Speaker: Second zero-zero.

Speaker: Second zero-zero.

Speaker: Save and commit.

Speaker: Changes committed.

Speaker: And let me know when you are ready to activate.

Speaker: Ready to activate.

Thomas Burghardt: And as you just heard, our new T-zero is 10.16pm Pacific time or 6.16 UTC. The Astra teams are now nine minutes and 30 seconds left.

Speaker: Go, Red lead.

Speaker: Go.

Speaker: FTS.

Speaker: FTS is go.

Speaker: Delphine.

Speaker: Go.

Speaker: Aether.

Speaker: Go.

Speaker: Odin.

Speaker: Go.

Speaker: INCO.

Speaker: INCO is go.

Speaker: ACE.

Speaker: Go.

Speaker: Launcher.

Speaker: Launcher is go.

Speaker: Orbit.

Speaker: Go.

Speaker: Booster.

Speaker: Go.

Speaker: GNC.

Speaker: Go.

Speaker: FAO.

Speaker: Go.

Speaker: CDH.

Speaker: CDH is go.

Speaker: Tango.

Speaker: Tango's go.

Speaker: Safety.

Speaker: Safety is go.

Speaker: Flight is go. Tango, confirm that an AV1 managed polling. We are still in ground mode.

Speaker: We are grounding and do both grounding guidance, turning only ground polling, on. [Inaudible] only ground to set to true.

Speaker: Delphine, do you require new sequences?

Speaker: Sequences have not changed so we do not need to reload.

Speaker: Copy. Aether, please provide me with your flight sequence for the night.

Speaker: Aether flight sequence 806, Victor 3.

Speaker: Aether sequence 806, Victor 3, titled all horses but bosses. Slot zero, loading.

Thomas Burghardt: You just heard, the teams have polled go for launch. We are at T minus eight and counting.

Speaker: [Inaudible].

Speaker: Tango and AV1 manage polling. Please toggle do both grounding guidance.

Speaker: Do both grounding guidance set to true.

Speaker: Delphine, please confirm GSC igniter system is ready for launch.

Speaker: Igniter system is ready for launch.

Speaker: FTS, issue logic on AFTU. Verify cast is green and nominal.

Speaker: Inward. Logic enabled, issued and received, enabled AFTS.

Speaker: Copy.

Speaker: Tango, at this time, verify that the vehicle is ready for launch aside from tank pressures.

Speaker: Blue lines are met. Looks good.

Thomas Burghardt: If you are just joining us, we are at six and a half minutes and counting. Everything on track for a lift off at 10.16pm Pacific time. Teams have polled go for launch. We are now into the final steps of the countdown.

Speaker: RCO, flight on countdown at this time. I am looking for final range green and launch authorization for this evening.

Speaker: This is RCO. Range is green. You are authorized for launch.

Speaker: Thank you.

Thomas Burghardt: And you just heard the range as authorized go for launch. Range is green.

Speaker: Tango, at this time in the launch machine, I would like you to enable launch.

Speaker: Launch enabled.

Thomas Burghardt: Now, T minus five minutes and counting. Again, everything on track and nominal for lift off.

Speaker: RCO, flight on countdown. Verify range. Will be recording telemetry at lift off.

Speaker: This is RCO. I can confirm range is recording telemetry.

Speaker: Thank you.

Speaker: Four minutes. Reminder to control room. If you require RF data, please be prepared to switch over your [inaudible] pages at lift off. FSO, flight on countdown, please be prepared to issue option command at T plus 162. Calling out at event.

Speaker: Roger, 162.

Thomas Burghardt: Coming up on three minutes and counting. Again, we are at three minutes away from lift off.

Speaker: Three minutes.

Thomas Burghardt: This is Astra's fourth orbital launch attempt for an LV and this LV0007 into the busiest end of the countdown. Let's listen in for the final steps and lift off.

Speaker: Reminder to all. That any three-word hold from here on out is an immediate abort regardless of source. Tango, please turn off igniter heaters.

Speaker: Igniter heaters coming off. Good guide response.

Speaker: FTS, you are good to send a master enable and watchdog on AFTU.

Speaker: Inward.

Speaker: Two minutes.

Speaker: Master enabled and watchdog sent and received on both AFTUs.

Speaker: Copy.

Thomas Burghardt: T minus 145, all systems nominal at this time.

Speaker: 90 seconds.

Thomas Burghardt: During launch, we will have live –

Speaker: ACE time to start –

Thomas Burghardt: – telemetry on the bottom part of your screen.

Speaker: – PSD recordings.

Speaker: Done.

Speaker: And start down range recording.

Speaker: Also done.

Speaker: 60 seconds. Vehicles on internal control.

Speaker: First stage locks tank, pressurizing. First stage fuel tank, pressing. 30 seconds. 20. 15. Water on. 10, nine, eight, seven, six, five, four – one, zero.

Speaker: First motion.

Speaker: Start first motion. Vehicle is ready to tower.

Carolina Grossman: LV0007 has cleared the pad and is on its way to space. Our next objective is Max Q. On the left side of your screen, you will see the progress of the vehicle through our mission milestones and you can see velocity and altitude.

Thomas Burghardt: LV0007 is sending through some clouds over Kodiak. Now looking at onboard views from the rocket. Vehicle leaves pad 50 meters per second, three kilometers in altitude.

Speaker: Vehicle is tracking downrange.

Thomas Burghardt: And the vehicle has just started pitching downrange. T plus one minute. The vehicle is now through maximum aerodynamic pressure, the point of maximum aerodynamic stress on the vehicle. Next up is main engine cutoff, or MECO, at just about T plus two minutes and 30 seconds. Vehicle now over 300 meters per second and at an altitude of 12 kilometers. And everything appears to be nominal at this time.

Speaker: Vehicle is on track downrange.

Carolina Grossman: We are confirming that the vehicle is on track downrange and all systems appear nominal, nearly at the end of our first stage flight.

Thomas Burghardt: You can see as the rocket ascends through the thinner parts of the atmosphere; you can see the engine plume expanding. That is a gorgeous shot from that onboard camera. And now we are coming up on main engine cutoff, just about 20 seconds from now.

Speaker: Good signal strength. Vehicle is tracking downrange.

Speaker: Option set.

Speaker: Confirmed option as received.

Carolina Grossman: And we have just heard the callout for main engine cutoff. There we have fairing separation and a successful stage separation.

Thomas Burghardt: Look at those gorgeous onboard views. And the recognition of the upper stage Aether engine. T plus three minutes 22 seconds and counting. The upper stage now taking control of the flight. Teams here in Alameda are very excited and rightfully so 3.5 minutes in the flight, everything on track so far. Again, this burn lasts just over five minutes. We would expect second engine cutoff at T plus eight minutes and 30 seconds. And this second stage's job is to get the payload and itself all the way up to orbital velocity.

Carolina Grossman: We are looking for the altitude of 500 kilometers for this mission.

Thomas Burghardt: Currently passing 200 kilometers, already into space, but of course you got to get that extra velocity and altitude to stay in orbit. That is the big ticket. But again, everything nominal at this time.

Carolina Grossman: Looking at our mission control team, still holding on to the controls. And here, we have the crew, folks at Astra, who are very happy with the outcome of today's flight so far. And we are still holding on for that second engine cutoff.

Thomas Burghardt: Everything continues to be nominal, T plus five minutes now. Vehicle now over 300 kilometers in altitude, 4.5 kilometers per second of speed.

Carolina Grossman: And we want to give a shout out as well at this point to Tebo Lasalle for our graphics this evening. We are very happy to see our mission progressing with the graphics that we have and continuing to watch that beautiful sight of the upper stage Aether engine, taking us to orbit.

Thomas Burghardt: You can see that actually engine belt glowing from the heat of the rocket operating, and of course, the little bit of plume in the night sky south of Kodiak. Again, this mission going to an 86 degree inclination, so a nearly polar orbit flying pretty much straight south from Kodiak. T plus six minutes, about 2.5 minutes left in this upper stage burn and everything on track so far.

Carolina Grossman: So we have got a little bit over two minutes remaining in this upper stage flight. We are just 400 kilometers, which again we are now less than 100 kilometers for our target orbit.

Thomas Burghardt: Vehicle now traveling 5.5 kilometers every second at an altitude of 434 kilometers. Again, that live telemetry is in the bottom right-hand of your screen. And on the left, you are seeing the different milestones. We are into second stage flight at T plus seven minutes, about a 1.5 minute left to go. Again, there is no deployed payload on board the upper stage, so as long as this second stage burn complete successfully, there will be a simulated deployment signal and then that is it. The main objective is to reach orbit and we are just over a minute away from that happening. And T plus seven minutes 30 seconds, all on track. A big shout out to the teams here in Alameda watching closely.

Speaker: Engine pressure is still looking good.

Thomas Burghardt: T plus eight minutes in the flight, also subs are nominal, second stage burn coming to a close here shortly. And there you have it. Orbital insertion. Second engine cut off and Astra's LV0007 has successfully reached orbit. There is a new orbital rocket. And there is the view of the simulated payload, the mass stimulator up top. Mission success. Just a nine minute trip to orbit and Astra is in orbit.

Carolina Grossman: And I can speak for the team. Everyone is hugging and cheering here. We are absolutely bursting with pride at LV0007, lucky number seven. This represents a huge, huge step in our mission to improve life on earth from space.

Thomas Burghardt: Astra's fourth orbital launch attempt. LV0007, the first one to achieve orbit, a successful test flight and demonstration, paving the way for future customer missions. Very exciting to see here, absolutely gorgeous views all the way and a very happy team here in Alameda. I am sure a very happy team up in Kodiak as well. There is your flight path right down the middle.

Carolina Grossman: I want to say to everyone who has joined us, thank you so much for sticking with us. And again, to confirm, we have accomplished our main objective for today. LV0007 has reached orbit with its test payload. I am so proud of our incredible milestone for Astra and all of our partners, a major step forward in our mission. And we will continue to provide innovative low-cost and nimble launch capabilities riding on this evening's success.

Thomas Burghardt: From the NASASpaceflight team, this is Thomas Burghardt, News Director. I just want to say a big thank you to Astra for trusting NASASpaceflight with this broadcast being able to see firsthand the first successful orbital launch of a new company's rocket is just something incredible. It is incredible to be here with the teams just from our side. This is so cool to experience and a huge congratulations, Carolina, to you and the entire Astra team on this accomplishment, is no small feat, and of course, the iterative path to orbit it took, you learned a whole lot on the way there but this has just been so cool to watch. Thank you so much for partnering with us to do this.

Carolina Grossman: Thank you so much, Thomas. Let us go celebrate.

Thomas Burghardt: All right. Everyone, thank you so much for watching. This has been super cool. Again, Astra has successfully reached orbit with LV0007 and we are going to stick around for just a couple seconds here. I believe we are going to have a quick visitor here. Mr. Chris Kemp, have on comms with us really quick.

Chris Kemp: How is it going?

Thomas Burghardt: It is going well. Of course, Chris Kemp, CEO of Astra. Chris, congratulations to you and the team. How are you feeling right now?

Chris Kemp: Absolutely incredible. The team has worked so hard on this for so many years. And this just really seeing iteration after iteration, failure after failure lead to success. Everyone is just incredibly passionate about

Yeah, I mean it is an incredibly hard thing to do. Continuing to do it is incredibly hard. We have rocket serial number 8, 9, 10 in production so we are just getting started.

Thomas Burghardt: Absolutely. Chris, thank you so much for allowing us to be involved in this and best of luck going forward and go celebrate.

Chris Kemp: Indeed. Thank you guys.

Thomas Burghardt: Again, everyone thank you so much for joining us. Carolina, Chris, the entire Astra team, the entire NASASpaceflight team, and most of all, everyone watching at home, thanks for tuning in. Big thank you to Astra and partnering with us to help make this broadcast happen. Could not have done it without you and NASASpaceflight and Astra. Looking forward to future Astra launches. Stay tuned for future space flight coverage on NASASpaceflight. With this mission success, we are going to go ahead and wrap it up and sign off for tonight. Thank you all so much for watching. And we will see you next time.

[END OF TRANSCRIPT]