

stellar times.

all you need to know about humanity's journey to the moon, mars, and beyond

as of **tue 09/29/2026**

week of 09/28 · starship reaches orbit

baa.business/stellar-times

"We choose to go to the Moon in this decade and do the other things, not because they are easy, but because they are hard."

john f. kennedy · rice university · 1962

"Earth is the cradle of humanity, but one cannot live in the cradle forever."

konstantin tsolkovsky · letter · 1911

"The go/no-go poll for orbit has finished. And we are go for orbit."

spacex flight 14 webcast · 09/28/2026

FRONT PAGE · STARSHIP FLIGHT 14

starship reaches orbit and drops off 26 starlink satellites

Ship 41 lost an engine on ascent, held for about 20 minutes, got a go for orbit, and deployed all 26 Starlink V3 satellites before an early, on-target Pacific splashdown.

26	~26 Tbps	~13M	~1.2%
v3 satellites deployed	design downlink	subscribers equiv. · baa est.	world cross-border internet bw · baa est.

Starship lifted off from Starbase at 7:48 a.m. CT on Monday, Sept. 28, its 14th flight and first orbital attempt. One of the ship's engines shut down early. The webcast briefly said the ship would not reach orbit, then engineers confirmed the three sea-level Raptors needed for later burns were healthy, and the call came: go for orbit.

A single Raptor, fed from the header tank in the nose, fired for orbit insertion, a burn Starship had never done. Deployment began about 34 minutes after liftoff and ran for roughly half an hour. SpaceX reports contact with every satellite over laser links, ground stations, and user terminals.

Because of the ascent engine issue, the team cut the planned ~10 hour, six-orbit profile and flew a first deorbit burn from orbit, then a three-engine landing burn and flip to a splashdown north of Hawaii at 11:57 a.m. ET. As usual for ocean landings, the ship tipped over and exploded afterward.

In people terms, 26 Tbps at a 2 Mbps busy-hour allowance per home (Stifel) is up to about 13 million subscribers, and about 1.2% of TeleGeography's 2,259 Tbps of international internet bandwidth (BAA est.). Service starts within a few weeks, per SpaceX.

flight 14 timeline · eastern time



why v3 matters · capacity per satellite

DOWNLINK PER SATELLITE



UPLINK PER SATELLITE



AI · COMPUTE

anthropic could pay spacex up to \$84.5b for compute

Anthropic's confidential IPO prospectus, seen by Reuters, shows compute deals with SpaceX and xAI worth up to \$84.5B through 2029, nearly double the ~\$45B in SpaceX's own filing. Most of it is cancelable on 90 days notice. Page 3.

GOVERNANCE · TESLA

sec clears tesla's retail voting program

A Sept. 29 no-action letter lets retail holders opt into standing instructions to vote with the board. No Tesla and SpaceX merger agreement has been filed. Page 3.

THIS WEEK

crew-13 and transporter 18 on oct. 1

Two SpaceX targets on Thursday: Crew-13 to the ISS and the Transporter 18 rideshare from Vandenberg. Calendar on page 4.

STARLINK V3

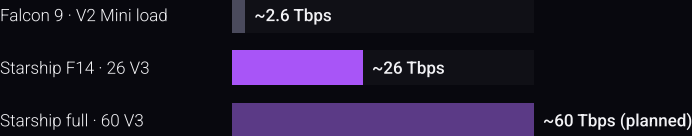
one starship launch adds as much internet as ten falcon 9s

Each V3 is designed for 1 Tbps down, about 500,000 subscribers at a 2 Mbps busy-hour allowance (BAA est.). Flight 14's 26 satellites carry roughly 26 Tbps.

SpaceX puts it this way: one Starship load of V3 moves about as much bandwidth as ten Falcon 9 launches of the older V2 Mini. A fully loaded Starship is planned to carry up to 60 V3s. Analyst Sawyer Merritt put Flight 14's addition at about 3% of the whole constellation's capacity, and Starpath's math lands in the same place, at about 0.11% of network capacity per V3.

Those are design numbers, not what a customer sees tomorrow. Each satellite still has to unfold antennas and arrays, link up by radio and laser, raise and circularize its orbit, and pass checkout. Real service depends on where the satellites sit, ground gateways, and demand.

design downlink added per launch



Design downlink. SpaceX: one F14 load equals ~10 F9 V2 launches; full load up to 60 V3.

more beams, more customers per satellite



Beams each satellite can steer at once. Starpath, Converge Digest (09/28).

flight 14 next to the world's cross-border bandwidth



TeleGeography, mid-2026 and year-end 2025. Satellites: design capacity.

Flight 14 is about 1.2% of international internet bandwidth and about 0.3% of all used cross-border capacity, including private cloud networks (BAA est.). Subscriber counts are a ceiling: satellites spend much of each orbit over oceans and empty land.

HOW IT WORKS · A V3 SATELLITE

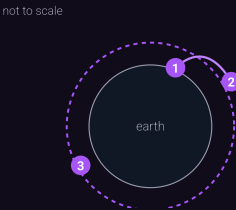
how a v3 moves your data

- User beams.** Phased array antennas steer 2,048 downlink and 2,048 uplink beams electronically, no moving dish. V2 had 192 and 144.
- Space lasers.** Six optical links at 400 Gbps each pass traffic satellite to satellite, so data can cross an ocean without touching the ground.
- Backhaul.** About 1.2 Tbps of radio links across Ka, E, V, and W bands connect to ground gateways and the wider internet.

HOW IT WORKS · GETTING TO ORBIT

how flight 14 got to orbit and back

- Safe path first.** The first ship burn put it on a suborbital track that would splash down safely even if control was lost.
- Go for orbit.** After a health check, one Raptor fired from the header tank to raise the low point of the path and close the orbit.
- Come home.** A deorbit burn dropped it back into the atmosphere. Three engines relit for the flip and landing burn.



GATES AFTER FLIGHT 14

sustained orbit	DONE	Flight 14, Sept. 28
operational payload	DONE	26 V3 in orbit, contact with all
deorbit from orbit	DONE	first deorbit burn, on-target splashdown
ship catch at tower	OPEN	not attempted on Flight 14
ship reuse	OPEN	not attempted on Flight 14
propellant transfer	OPEN	ship to ship, gates lunar and Mars dates

Done: demonstrated in flight · Open: not yet demonstrated

AI · COMPUTE

anthropic doubles its spacex ai deal to \$84.5b, but can quit in 90 days

Up to \$84.5B through 2029 for Nvidia-based compute, most of it cancelable on 90 days notice.

\$518B	~80%	\$84.5B	90 days
10-yr infra plan	non-cancelable	spacex, max	spacex cancel notice

Anthropic expects to spend at least \$518B over ten years on AI infrastructure with six partners, according to its confidential IPO prospectus as reported by Reuters on Sept. 29. About 80% of that is non-cancelable or owed regardless of use.

SpaceX is the exception. SpaceX's own IPO paperwork had described about \$45B, or \$1.25B a month for three years. The new figure is up to \$84.5B, and most of it can be ended with 90 days written notice. The capacity traces to May 2026, when Anthropic took exclusive use of Colossus 1, a SpaceX facility with more than 220,000 Nvidia GPUs on over 300 MW. SPCX shares rose about 3% on the report.

anthropic infrastructure commitments by partner

Broadcom · equipment leases		\$161.2B
Google		\$111.1B
Amazon		\$110.0B
SpaceX / xAI · compute		up to \$84.5B
Microsoft		\$31.4B

Purple: largely cancelable on 90 days notice. Gray: largely non-cancelable. Reuters, Sep 29.

HOW IT WORKS · RENTING AI COMPUTE

how a compute lease works

- The building.** A data center packs GPUs, power, and cooling. Colossus 1 draws over 300 MW.
- The rent.** The AI lab pays a monthly rate for reserved capacity, used mainly for training or for inference, meaning answering users.
- The lease.** Take-or-pay deals bill the full amount no matter what. A 90-day cancel clause lets the renter walk with a quarter's notice, which is the item to watch.

TESLA · SPACEX

tesla and spacex keep getting closer, but no merger yet

At the All-In Summit on Sept. 15, asked why Tesla and SpaceX stay separate, Musk said: "With all this collaboration, on so many levels, who can imagine what action one might take when there's so much close collaboration in so many areas." Gwynne Shotwell said the businesses are integrating "faster than I thought." Neither company has announced or filed a merger agreement.

merger math · two thresholds one point apart

\$2T Tesla value (CEO award tranche 1)		39.0%
Tesla holders own 50% of combo		39.9%

Premium needed, FinanceFeeds calculation, Sep 2026. Estimate only.

Prediction markets split on timing: about 20% for an announcement before the end of 2026 (per FinanceFeeds) and 66% on Kalshi for a merger before 2028 (per Teslarati).

HOW IT WORKS · RETAIL VOTING

how tesla's new voting option works

- SEC staff issued a no-action letter on Sept. 29 for Tesla's voluntary retail voting program.
- Retail holders can opt into a standing instruction to vote with the board, on all matters or on all except contested director elections and mergers.
- It is free, can be overridden per proposal or canceled anytime, and comes with an annual reminder. Other issuers can use the same framework.

THE ANTHROPIC MATH · BAA EST.

the old deal, per month	$\$45B \div 36 \text{ months} = \$1.25B \text{ a month}$
how much bigger	$\$84.5B \div \$45B = 1.9\times \text{ the old ceiling}$
rent per GPU, per month	$\$1.25B \div 220,000 \text{ GPUs} = \sim\$5,700$
rent per GPU-hour	$\$5,700 \div 730 \text{ hours} = \sim\7.80 an hour
power per GPU, all-in	$300 \text{ MW} \div 220,000 \text{ GPUs} = \sim 1.4 \text{ kW, incl. cooling and networking}$
rent per megawatt	$\$1.25B \times 12 \div 300 \text{ MW} = \sim\$50M \text{ per MW a year}$
the exit cost	$90 \text{ days} \times \$1.25B \text{ a month} = \sim\$3.75B \text{ to walk away}$
locked in elsewhere	$80\% \times \$518B = \sim\$414B \text{ owed regardless of use}$
spend per year, all partners	$\$518B \div 10 \text{ years} = \sim\$52B \text{ a year}$

The per-GPU figures assume the \$1.25B a month maps entirely to Colossus 1, and that 220,000 GPUs and 300 MW are the floors reported. Real pricing is not public. They are a sense of scale, not a quote.

THE NEXT FEW WEEKS

what’s launching next

thu 10/01	Crew-13 to the ISS, 11:10 a.m. ET. SpaceX target.
thu 10/01	Transporter 18 rideshare, Vandenberg. Target.
10/05	SDA Tranche 1 Transport Layer A military data relay satellites. Target.
mon 10/19	H3 · Martian Moons eXploration (MMX), JAXA’s mission to Phobos. Target.
october	Starlink V3 checkout and orbit raising, then service within a few weeks. SpaceX.
tbd	Starship Flight 15. No SpaceX date. An Oct. 19 FAA planning date was reported, and trackers now show TBD.
by 12/31	New Glenn return to flight after the May 28 pad explosion. Company target.
mid-2027	Artemis III, crewed Orion docking practice with a lander in Earth orbit. NASA target.

ALSO THIS WEEK

relativity’s terran r gets its environmental finding

The Federal Register published a Finding of No Significant Impact for Terran R at Cape Canaveral on Sept. 28. A FONSI is an environmental finding, not a launch license.

COOL FACTS

things worth knowing

~7.7 km/s

Orbital speed at Flight 14’s ~275 km altitude. That is one lap of Earth in about 90 minutes. BAA calc.

33

Raptor engines on the Super Heavy booster, burning liquid methane and liquid oxygen. Both can in principle be made on Mars from carbon dioxide and water ice.

~45% faster

Light moves faster through vacuum than through glass fiber, so laser links between satellites can beat long undersea cable routes on delay.

3 to 22 min

One-way radio delay between Earth and Mars, depending on where the planets are. No live joystick driving on Mars.

~26 months

Gap between Earth to Mars launch windows. Miss one and the next opportunity is about two years out.

24 h 39 m

Length of a Mars day, called a sol. Close enough to Earth’s that a body clock could adapt.

220,000+

Nvidia GPUs in Colossus 1, the SpaceX data center Anthropic rents, drawing over 300 MW.

HOW IT WORKS · THE SOLAR SYSTEM

how a mars launch window works

Earth laps the Sun faster than Mars. About every 26 months Earth sits in the right spot for a low-energy transfer orbit that touches both planets. Leaving then takes the least propellant, which is why Mars cargo dates cluster.

sources · SpaceX Flight 14 page (09/28) · Spaceflight Now (09/28) · Space.com (09/28) · SpaceQ (09/28) · RTÉ / Reuters (09/28) · Light Reading (09/28) · Converge Digest (09/28) · Starpath (09/28) · TeleGeography (2025, 2026) · Stifel (06/2024) · Basenor, citing Sawyer Merritt (09/2026) · SpaceNexus (09/28) · Reuters via Investing.com (09/29) · The Information via Techmeme (09/29) · Stocktwits (09/29) · Crypto Briefing (09/29) · Sullivan & Cromwell, Bloomberg Law, Electrek (09/29) · FinanceFeeds (09/2026) · IBTimes UK, Teslarati (09/2026) · Blue Origin, Space.com (New Glenn) · Next Spaceflight, T-Minus Zero (Flight 15) · UchUchU, SpaceNexus launch calendars (10/2026) · Federal Register (09/28) · NASA general reference for planetary facts. Quotes: JFK Rice University address (09/12/1962), Tsiolkovsky letter (1911), SpaceX webcast (09/28/2026). BAA estimates are labeled.

THE LAST WORD · EVERY WEEK

ben's countdown to mars

Our better-than-nothing guess at when a person first stands on Mars, and every step that has to happen first.

3,400 days to 01/20/2036 · BAA est.

4 of 23 milestones done · counted from 09/29/2026



milestone and what it proves	date	to go	odds
Booster caught by the launch tower	10/13/2024	✓	DONE
Raptor engine relit in space	11/19/2024	✓	DONE
A flown booster flies again	05/27/2025	✓	DONE
First orbital Starship and first V3 Starlink deploy	09/28/2026	✓	DONE
Ship caught by the launch tower The upper stage can come back whole, so it can fly again. BAA est.. Launches: 2 to 3 more test flights first.	03/20/2027	172 d	LOW
First tanker Starship flies A stripped-down ship built only to carry propellant, the workhorse of every refill. BAA est.. Launches: 1.	05/20/2027	233 d	LOW
Artemis III: crewed Orion docks with a lander in Earth orbit People and Starship working together in space. NASA target mid-2027. Launches: 1 Starship plus NASA's SLS rocket.	06/30/2027	274 d	MEDIUM
A caught ship flies again Both stages reused, which is what makes dozens of tanker flights affordable. BAA est.. Launches: 1.	08/15/2027	320 d	LOW
Ship-to-ship propellant transfer in orbit Two ships dock and move super-cold propellant, the key that unlocks both the Moon and Mars. BAA est.. Launches: 2, a few days apart.	10/15/2027	381 d	LOW
Starship launching about weekly from Texas and Florida Refilling needs many launches in a short span, so two coasts and fast pad turnaround matter. BAA est.. Launches: about 4 a month.	01/15/2028	473 d	LOW
Propellant kept cold in orbit for weeks Boil-off is under control, so fuel waits in orbit while the next tankers arrive. BAA est.. Launches: 1 to 2.	03/01/2028	519 d	LOW
Orbital depot filled by a string of tankers A gas station in orbit that can top off a Moon or Mars ship. BAA est.. Launches: about 10+ tankers in roughly 6 weeks (BAA est.).	06/15/2028	625 d	LOW
First uncrewed Starship landing on the Moon Landing a Starship on another world after refilling in orbit. BAA est.. Launches: 1 lander plus about 10+ tankers.	10/15/2028	747 d	LOW
First uncrewed Starships launch for Mars Hitting a Mars launch window with several fully refilled ships. BAA est. (late-2028 window). Launches: 2 to 4 ships, each needing several tanker flights.	12/15/2028	808 d	LOW
First Starship lands on Mars Entry, descent, and landing in thin Martian air. BAA est. (~7-month trip). Launches: 0 (already on the way).	07/15/2029	1,020 d	LOW
First crew lands on the Moon in a Starship Starship can carry people down to another world and back up. BAA est.. Launches: 1 lander, 1 crew rocket, about 10+ tankers.	11/15/2029	1,143 d	LOW
Second Mars wave: power, propellant plant, and more cargo launch Sending the factory that makes the fuel home. BAA est. (early-2031 window). Launches: about 4+ ships and dozens of tankers.	02/20/2031	1,605 d	LOW
Power and propellant-plant hardware lands on Mars The hardware survives landing and can be set up without people. BAA est.. Launches: 0 (already on the way).	09/15/2031	1,812 d	LOW
First rocket propellant made on Mars Methane and oxygen from Martian CO2 and ice, so a ship can fly home. BAA est.. Launches: 0.	08/01/2032	2,133 d	LOW
Third Mars wave: habitats, spare ships, and supplies launch Everything the first crew needs is waiting before they leave. BAA est. (spring-2033 window). Launches: about 4+ ships and dozens of tankers.	04/20/2033	2,395 d	LOW
Crew lives aboard a Starship in Earth orbit for months Life support, radiation shelter, and health hold up for a trip-length stay. BAA est.. Launches: 1 to 2 plus tankers.	06/01/2034	2,802 d	LOW
First crew launches for Mars People leave Earth on a fully refilled ship. BAA est. (mid-2035 window). Launches: crew ship plus cargo ships and dozens of tankers.	07/10/2035	3,206 d	LOW
First human steps onto Mars The whole chain works end to end. BAA est. (~6-month trip). Launches: 0 (already on the way).	01/20/2036	3,400 d	LOW

Moved this week: First human on Mars moved from 09/12/2033 to 01/20/2036, and first crew launch from 04/12/2033 to 07/10/2035. Once every step was listed, they no longer fit before the spring-2033 window. Propellant transfer, ship catch, uncrewed Moon landing, and first Mars cargo also moved later to match; the web edition lists each move.

Dates marked BAA est. are our own guesses, not SpaceX or NASA commitments. Odds are our confidence the date holds within about three months. Mars launch windows open about every 26 months (late 2028, early 2031, spring 2033, mid 2035), so a Mars slip usually costs about two years. Launch counts are rough BAA estimates. Almost everything after Flight 14 depends on refilling ships in orbit, which has not been done yet.