

Elon Musk's biggest worry about SpaceX's first astronaut mission isn't the rocket launch — it's the spaceship's return to Earth

Morgan McFall-Johnsen and Dave Mosher May 30, 2020, 11:41 AM



SpaceX CEO Elon Musk speaks at the International Astronautical Congress on September 29, 2017 in Adelaide, Australia. [Mark Brake/Getty Images](#)

SpaceX is set to **launch its first astronauts** to the International Space Station on Saturday — a mission that would make history, but is not without **significant risks**.

Elon Musk, the founder of SpaceX, has said his biggest concern is not the rocket launch, though: It's safely returning NASA astronauts [Bob Behnken and Doug Hurley](#) to Earth.

Musk said he's worried about the Crew Dragon spaceship's asymmetric design, which he said has a minor chance of causing the spaceship to rotate.

Such a rotation, he said, could catch superheated plasma in the [ship's escape thrusters](#) as it plows through Earth's atmosphere and slows down from 25 times the speed of sound.

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Update: [SpaceX launched astronauts Bob Behnken and Doug Hurley into orbit around Earth on Saturday.](#) They are expected to reach the International Space Station at 10:27 a.m. ET on Sunday.

CAPE CANAVERAL — SpaceX is poised to rocket its first people into space on Saturday, resurrecting human spaceflight in America after a nine-year hiatus in NASA astronaut

launches.

The mission, called Demo-2, aims to launch NASA astronauts Bob Behnken and Doug Hurley atop a Falcon 9 rocket, orbit Earth aboard SpaceX's Crew Dragon spaceship, and [dock with the International Space Station](#). After staying for up to 110 days, the crew will depart inside Crew Dragon, reenter Earth's atmosphere, and splash down in the ocean.

The launch, scheduled for 3:22 p.m. ET, is not without risk. NASA has estimated a 1-in-276 chance of losing the crew, but it's not the part of the mission that most worries SpaceX CEO Elon Musk.

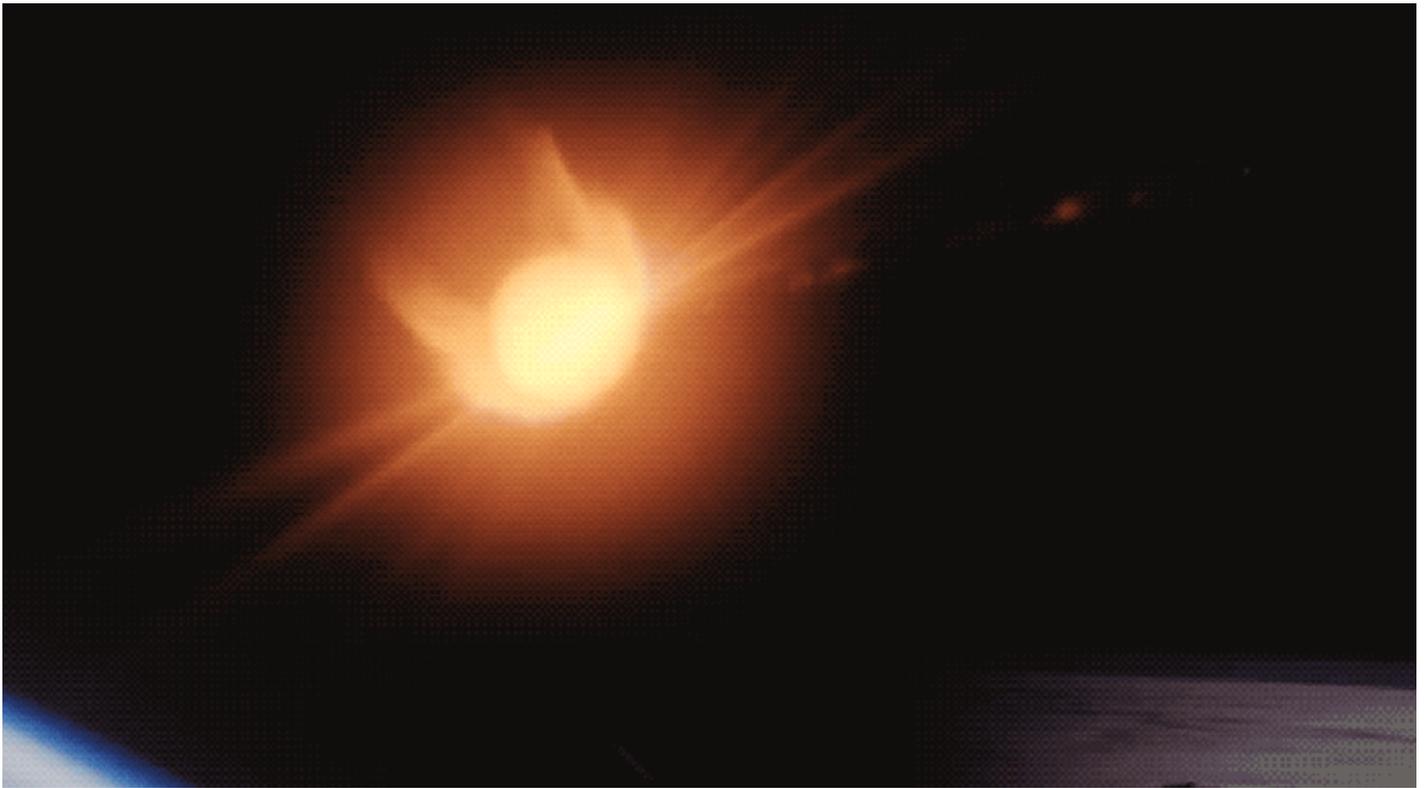
"The part that I would worry most about would be reentry, which won't happen, hopefully, for a few months from now," Musk [told Irene Klotz of Aviation Week](#).

During reentry, the Crew Dragon must hurtle back through Earth's atmosphere — a process that burns up spacecraft that aren't designed to survive the heat.

Musk added that while the threat was low, his "biggest concern" about the new spaceship was the capsule's asymmetric design, which is driven by its emergency escape system. While

screaming back to Earth at 25 times the speed of sound, the capsule's heat shield will deflect and absorb the energy of superheated plasma — but the forces of atmospheric reentry have a slim chance of causing catastrophe.

"If you rotate too much, then you could potentially catch the plasma in the super Draco escape thruster pods," Musk [said](#), adding this could overheat parts of the ship or cause it to lose control (by wobbling). "We've looked at this six ways to Sunday, so it's not that I think this will fail. It's just that I worry a bit that it is asymmetric on the backshell."



An illustration of SpaceX's Crew Dragon spaceship returning to Earth with a blaze of plasma ahead of its heat shield. [SpaceX via YouTube](#)

Musk expressed the same concern about a roll instability, as the issue is called, during a press briefing after the company's Demo-1 mission — an [uncrewed test flight of its spaceship](#) to orbit and back — lifted off in March 2019.

He also noted a concern about the ship's parachutes, which must deploy to slow down the Crew Dragon as it falls through thicker atmosphere.

"The parachutes are new. Will the parachutes deploy correctly? And then will the system guide Dragon 2 to the right location and splash down safely?" Musk said at the time, though he said he sees "hypersonic reentry as probably my biggest concern, just because of the asymmetric back shell."

The Falcon 9 and Crew Dragon have undergone extensive testing

During a May 25 press briefing, [Hans Koenigsmann](#), SpaceX's vice president of mission assurance, was asked what kept him up at night in regard to the launch. He, too, pointed to parts of the reentry process.

Like Musk had in the past, he named the Crew Dragon's parachutes as one concern, since their packing can't be tested until they're deployed.





SpaceX performs a parachute test for its Crew Dragon spaceship, which will ferry NASA astronauts to and from space. [SpaceX](#)

But Koenigsmann indicated he's deeply satisfied with the years of work toward making Crew Dragon safe to fly.

SpaceX has cut down risk by flying its Falcon 9 rocket dozens of times beforehand. It also based the design of its new Crew Dragon vehicle, also called Dragon 2, on its older Cargo Dragon ship, or Dragon 1, which has successfully reached the ISS 20 times. Meanwhile, the

Crew Dragon has [flown to orbit just once](#) and performed a [high-stress abort test](#) once, in January 2020.

"I'm at the point right now where I'm actually worried about the weather, and that's a good sign," Koenigsmann told Business Insider.

The original launch time, on Wednesday, was scrubbed and delayed to Saturday as [storm clouds threatened lightning](#).

As of Saturday morning, forecasts predicted a 50/50 chance that weather would be unsafe for launch. As of 49 minutes before launch time, weather monitors said the clouds were clearing.
