

“The trampoline is working”–SpaceX returns human spaceflight to America

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The rain showers ended. The clouds parted. And so on Saturday afternoon, SpaceX’s Falcon 9 rocket had blue skies above it during the final minutes of a countdown to launch from Kennedy Space Center in Florida.

The Falcon 9 rocket had launched 84 times before. In fact, no U.S. rocket now flying has launched as much as the Falcon 9 rocket. So, this was all kind of routine in that sense. But for the first time, the Falcon 9 rocket carried two humans on board, inside a Crew Dragon spacecraft. That changed

everything.

So much was at stake, the immensity of this almost became too much to bear as the clock ticked down.

Two human lives, NASA astronauts Doug Hurley and Bob Behnken, hung in the balance. Thousands of people had put a decade of immensely hard work into reaching this moment. Success meant that NASA finally had its own access into space for astronauts. And it is not really an overstatement to say that if SpaceX flubbed this launch on the biggest of stages—if the unthinkable happened—it would blacken the future of commercial space.

As the clock ticked into the final seconds, then, time all but stopped. This moment felt both amazing and incredibly nervy.

Finally, the clock hit T-0. The rocket's nine Merlin engines ignited and slowly—the Falcon 9 has no solid-rocket boosters and thrust-to-weight ratio of just 1.2—it began to climb into space. Then, it picked up speed, steadily climbing skyward. The first stage performed nominally, and once spent, dropped back toward Earth. It would land on an autonomous drone ship. Meanwhile, the second stage kept burning, before finally depositing the Crew Dragon spacecraft into a perfect orbit.

A couple of hours into the flight, the Dragon's spacecraft commander, Hurley, radioed back to SpaceX mission control. "It's been a spectacular spacecraft so far." Later, he would announce the name the crew had chosen for this Dragon, *Endeavour*.

Dragon is due to dock with the International Space Station on Sunday, at 10:29am ET (14:29 UTC). The mission will not be a success until Hurley and Behnken land in the ocean, and return safely to Earth, probably in about two months. But the mission sure got off to one hell of a start on Saturday afternoon.

Unifying moment

Before Saturday only the national space programs of Russia, the United States, and China had launched humans into orbit. Now, SpaceX—with NASA’s funding and considerable help—has joined that exclusive club.

NASA, of course, has been sidelined in the human spaceflight game since 2011, when the space shuttle retired. Since then, NASA has relied on Russian Soyuz spacecraft for access to the station. When tensions between the United States and Russia in 2014, a senior Russian official who now heads the country’s space program, Dmitry Rogozin, taunted NASA by suggesting the space agency use a trampoline to launch its astronauts.

At a post-flight news conference on Saturday, Musk quipped, “The trampoline is working.”

[embedded content]

Say hello to astronauts in orbit.

But for the most part, Musk and NASA administrator Jim Bridenstine emphasized the uplifting nature of Saturday’s successful launch at a time when the nation is divided, angry, and hurting. “This launch is for all of America,” Bridenstine said. The space agency, he said, could bring people together by crossing political and international divides.

Musk, too, hoped the moment would be a unifying one for the nation.

“I think this is something that should really get people, I mean, right in the heart,” he said. “The United States is the distillation of the spirit of exploration. I think that’s something that’s particularly important in the United States, but appeals to everyone throughout the world that has within them the spirit of exploration.”

SpaceX delivers

Eight months ago, Bridenstine was frustrated with the amount of time SpaceX and Musk were spending on his Starship project. Shortly before a major media event in South Texas, Bridenstine tweeted a message that effectively asked SpaceX to focus on commercial crew. "It's time to deliver," he said.

On Saturday, Ars asked Bridenstine if SpaceX had delivered. "Since that day SpaceX and Elon have delivered on everything that NASA has asked them to deliver on, and at a speed that we never would have guessed," Bridenstine said. "My engineering team said this was not going to be able to be achieved in this amount of time."

What impressed Bridenstine—who has had to contend with oft-delayed programs as NASA's chief—was the velocity at which SpaceX moved to complete parachute testing, ensure its SuperDraco thruster system was safe after an accident, and close out myriad other details. "SpaceX really delivered something that is magnificent, and that is speed," he said. "I don't believe anyone would have believed the speed at which SpaceX delivered."

As part of the commercial crew program, NASA has paid SpaceX a total of about \$3.1 billion for development of the Crew Dragon spacecraft, human-rating of the Falcon 9 rocket, and six operational missions to deliver astronauts to the International Space Station. The Planetary Society found that, in developing Crew Dragon, NASA spent significantly less than it had on any of its sixth other crewed spacecraft to date.

In turn, for its speed and cost efficiency, SpaceX gets the prestige of joining the exclusive human spaceflight club, and access to NASA experts. "NASA made us way better than we would have been," Musk said.

On Saturday, *all* of America seemed better for it.

Listing image by Trevor Mahlmann

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