NASA spacecraft rockets toward sun for closest look yet

August 12 2018, by Marcia Dunn

A Delta IV rocket, carrying the Parker Solar Probe, lifts off from launch complex 37 at the Kennedy Space Center, Sunday, Aug. 12, 2018, in Cape Canaveral, Fla. The Parker Solar Probe will venture closer to the Sun than any

other spacecraft and is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about the Sun. (AP Photo/John Raoux)

A NASA spacecraft zoomed toward the sun Sunday on an unprecedented quest to get closer to our star than anything ever sent before.

As soon as this fall, the Parker Solar Probe will fly straight through the wispy edges of the sun's corona, or outer atmosphere, that was visible during last August's total solar eclipse. It eventually will get within 3.8 million (6 million kilometers) of the surface in the years ahead, staying comfortably cool despite the extreme heat and radiation, and allowing scientists to vicariously explore the sun in a way never before possible.

No wonder scientists consider it the coolest, hottest mission under the sun, and what better day to launch to the sun than Sunday as NASA noted.

"All I can say is, 'Wow, here we go.' We're in for some learning over the next several years," said Eugene Parker, the 91-year-old astrophysicist for whom the spacecraft is named.

Protected by a revolutionary new carbon heat shield and other high-tech wonders, the spacecraft will zip past Venus in October. That will set up the first solar encounter in November.

Altogether, the Parker probe will make 24 close approaches to the sun on the seven-year, $1.5 billion undertaking.

A Delta IV rocket, carrying the Parker Solar Probe, lifts off from launch complex 37 at the Kennedy Space Center, Sunday, Aug. 12, 2018, in Cape Canaveral, Fla. The Parker Solar Probe will venture closer to the Sun than any other spacecraft and is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about the Sun. (AP Photo/John Raoux)

For the second straight day, thousands of spectators jammed the launch site in the middle of the night as well as surrounding towns, including Parker and his family. He proposed the existence of solar wind—a steady, supersonic stream of particles blasting off the sun—60 years ago.

It was the first time NASA named a spacecraft after someone still alive, and Parker wasn't about to let it take off without him. Saturday morning's launch attempt was foiled by last-minute technical trouble.

But Sunday gave way to complete success.

The Delta IV Heavy rocket thundered into the pre-dawn darkness, thrilling onlookers for miles around as it climbed through a clear, star-studded sky. NASA needed the mighty 23-story rocket, plus a third stage, to get the diminutive Parker probe—the size of a small car and well under a ton—racing toward the sun.

From Earth, it is 93 million miles (150 million kilometers) to the sun, and the Parker probe will be within 4 percent of that distance at its closest. That will be seven times closer than previous spacecraft.

The Mobile Service Tower is rolled back to reveal the United Launch Alliance Delta IV Heavy rocket with the Parker Solar Probe onboard, Saturday, Aug. 11, 2018, Launch Complex 37 at Cape Canaveral Air Force Station in Fla. A last-minute technical problem Saturday delayed NASA's unprecedented flight to the sun. Rocket maker United Launch Alliance said it would try again Sunday, provided the helium-pressure issue can be resolved quickly. Once on its way, the

Parker probe will venture closer to our star than any other spacecraft. (Bill Ingalls/NASA via AP)

"Fly baby girl, fly!!" project scientist Nicola Fox of Johns Hopkins University urged via Twitter.

It was the first rocket launch ever witnessed by Parker, professor emeritus at the University of Chicago. He came away impressed, saying it was like looking at the Taj Mahal for years in photos and then beholding "the real thing" in India.

"I really have to turn from biting my nails in getting it launched, to thinking about all the interesting things which I don't know yet and which will be made clear, I assume, over the next five or six or seven years," Parker said on NASA TV.

NASA's science mission chief, Thomas Zurbuchen, was thrilled not only with the launch, but Parker's presence.

A Delta IV rocket, carrying the Parker Solar Probe, stands on launch complex 37 after the launch was scrubbed at the Kennedy Space Center, Saturday, Aug. 11, 2018, in Cape Canaveral, Fla. The Parker Solar launch has been rescheduled for early Sunday morning. (AP Photo/John Raoux)

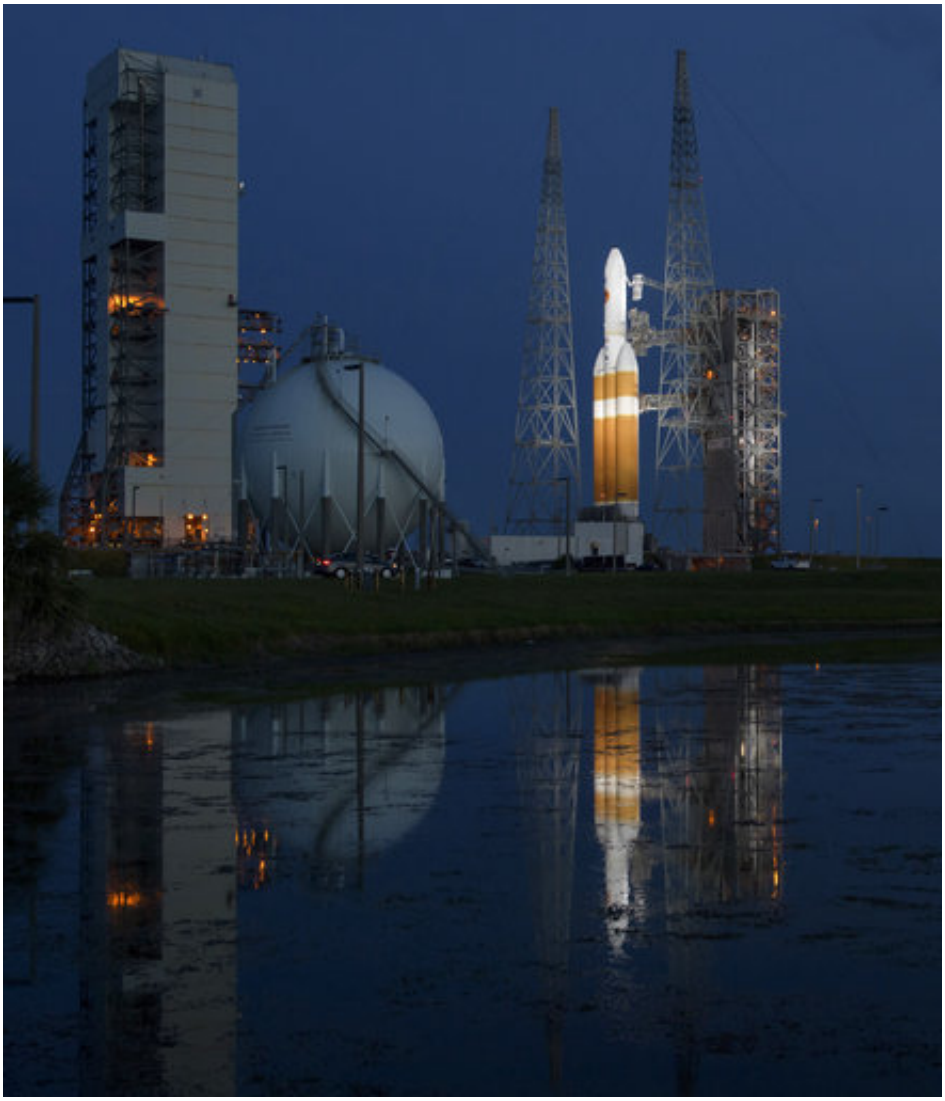
"I'm in awe," Zurbuchen said. "What a milestone. Also what's so cool is hanging out with Parker during all this and seeing his emotion, too."

Parker, the probe, will start shattering records this fall. On its very first brush with the sun, it will come within 15.5 million miles (25 million kilometers), easily beating the current record of 27 million miles (43 million kilometers) set by NASA's Helios 2 spacecraft in 1976. Zurbuchen expects the data from even this early stage to yield top science papers.

By the time Parker gets to its 22nd, 23rd and 24th orbits of the sun in 2024 and 2025, it will be even deeper into the corona and traveling at a

record-breaking 430,000 mph (690,000 kilometers per hour).

Nothing from Planet Earth has ever hit that kind of speed.



This photo provided by NASA shows the United Launch Alliance Delta IV Heavy rocket with the Parker Solar Probe onboard shortly after the Mobile Service Tower was rolled back, Friday, Aug. 10, 2018, at Launch Complex 37 at Cape Canaveral Air Force Station in Fla. NASA is sending the spacecraft straight into the sun's glittering crown, an atmospheric region so hot and harsh any normal visitor would wither. Set to launch early Saturday, the Parker Solar Probe is as heat-resistant as a spacecraft gets, essential for exploring our star

closer than ever before. (Bill Ingalls/NASA via AP)

Even Fox has difficulty comprehending the mission's derring-do.

"To me, it's still mind-blowing," she said. "Even I still go, really? We're doing that?"

Zurbuchen considers the sun the most important star in our universe—it's ours, after all—and so this is one of NASA's big-time strategic missions. By better understanding the sun's life-giving and sometimes violent nature, Earthlings can better protect satellites and astronauts in orbit, and power grids on the ground, he noted. In today's tech-dependent society, everyone stands to benefit.

With this first-of-its-kind stellar mission, scientists hope to unlock the many mysteries of the sun, a commonplace yellow dwarf star around 4.5 billion years old. Among the puzzlers: Why is the corona hundreds of times hotter than the surface of the sun and why is the sun's atmosphere continually expanding and accelerating, as Parker accurately predicted in 1958?

A Delta IV rocket stands ready for launch at complex 37 at the Kennedy Space Center, Friday, Aug. 10, 2018, in Cape Canaveral, Fla. The Parker Solar Probe, scheduled for lift off early Saturday morning, is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about our Sun. (AP Photo/John Raoux)

"The only way we can do that is to finally go up and touch the sun," Fox said. "We've looked at it. We've studied it from missions that are close in, even as close as the planet Mercury. But we have to go there."

The spacecraft's heat shield will serve as an umbrella, shading the science instruments during the close, critical solar junctures. Sensors on the spacecraft will make certain the heat shield faces the sun at the right times. If there's any tilting, the spacecraft will correct itself so nothing gets fried. With a communication lag time of 16 minutes, the spacecraft

must fend for itself at the sun. The Johns Hopkins flight controllers in Laurel, Maryland, will be too far away to help.

A mission to get close up and personal with our star has been on NASA's books since 1958. The trick was making the spacecraft small, compact and light enough to travel at incredible speeds, while surviving the sun's punishing environment and the extreme change in temperature when the spacecraft is out near Venus.

"We've had to wait so long for our technology to catch up with our dreams," Fox said. "It's incredible to be standing here today."

The tower structure for a Delta IV rocket rolls back for launch at complex 37 at the Kennedy Space Center, Friday, Aug. 10, 2018, in Cape Canaveral, Fla. The Parker Solar Probe, scheduled for lift off early Saturday morning, is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about our Sun. (AP Photo/John Raoux)

More than 1 million names are aboard the spacecraft, submitted last spring by space enthusiasts, as well as photos of Parker, the man, and a copy of his 1958 landmark paper on solar wind.

"I'll bet you 10 bucks it works," Parker said.

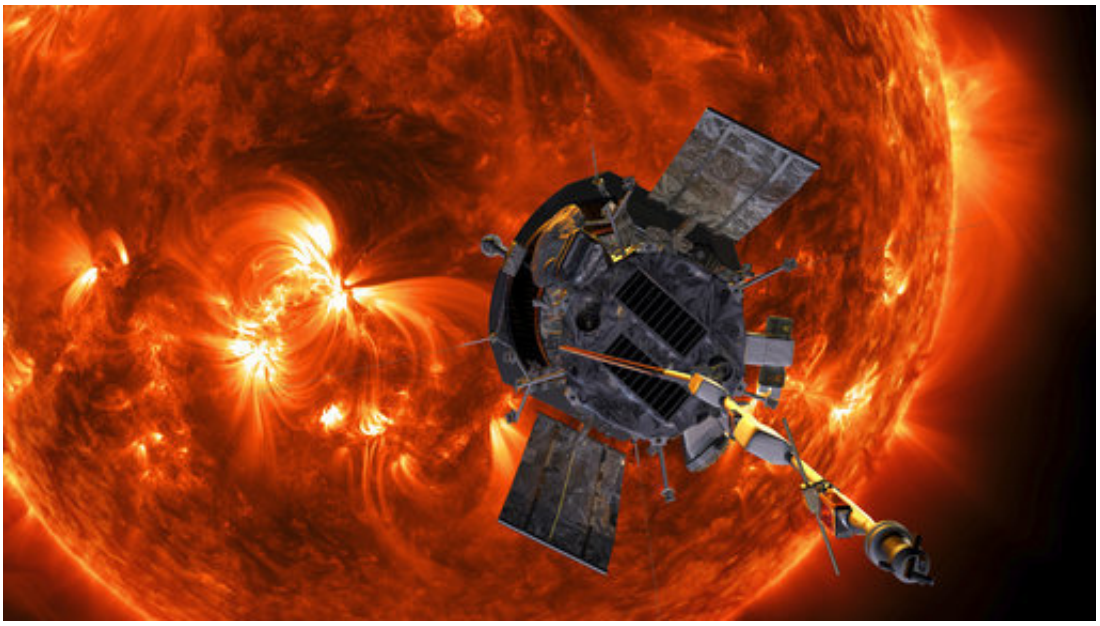
This photo provided by NASA shows the United Launch Alliance Delta IV Heavy rocket with the Parker Solar Probe onboard shortly after the Mobile Service Tower was rolled back, Friday, Aug. 10, 2018, Launch Complex 37 at Cape Canaveral Air Force Station in Cape Canaveral, Fla. NASA is sending a spacecraft straight into the sun's glittering crown, an atmospheric region so hot and harsh any normal visitor would wither. (Bill Ingalls/NASA via AP)

The tower structure for a Delta IV rocket rolls back for launch at complex 37 at the Kennedy Space Center, Friday, Aug. 10, 2018, in Cape Canaveral, Fla. The Parker Solar Probe, scheduled for lift off early Saturday morning, is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about our Sun. (AP Photo/John Raoux)

In this photo provided by NASA, astrophysicist Eugene Parker, center, stands with NASA Associate Administrator for the Science Mission Directorate Thomas Zurbuchen, left, and United Launch Alliance President and Chief Executive Officer Tory Bruno in front of the ULA Delta IV Heavy rocket with NASA's Parker Solar Probe onboard, Friday, Aug. 10, 2018 at Cape Canaveral Air Force Station, Fla. Humanity's first-ever mission into a part of the Sun's atmosphere called the corona, is scheduled to launch early Saturday. (Bill Ingalls/NASA via AP)

In this Thursday, Aug. 9, 2018 photo, astrophysicist Eugene Parker sits between Johns Hopkins University project scientist Nicola Fox, left, and NASA's science mission chief Thomas Zurbuchen, during a news conference about the Parker Solar Probe at the Kennedy Space Center in Florida. It's the first time NASA has named a spacecraft after someone who's still alive. (AP Photo/Marcia Dunn)

This July 6, 2018 photo made available by NASA shows the Parker Solar Probe in a clean room at Astrotech Space Operations in Titusville, Fla., after the installation of its heat shield. NASA's Parker Solar Probe will be the first spacecraft to "touch" the sun, hurtling through the sizzling solar atmosphere and coming within just 3.8 million miles (6 million kilometers) of the surface. (Ed Whitman/Johns Hopkins APL/NASA via AP)



This image made available by NASA shows an artist's rendering of the Parker Solar Probe approaching the Sun. It's designed to take solar punishment like never before, thanks to its revolutionary heat shield that's capable of withstanding 2,500 degrees Fahrenheit (1,370 degrees Celsius). (Steve Gribben/Johns Hopkins APL/NASA via AP)

In this Thursday, Aug. 9, 2018, astrophysicist Eugene Parker attends a news conference about the Parker Solar Probe named after him, at the Kennedy Space Center in Florida. Sixty years ago, the young astrophysicist proposed the existence of solar wind. Many were skeptical and told him to read up on it first "so you don't make these killer mistakes," he recalls. (Kim Shiflett/NASA via AP)

Parker Solar Probe on a ULA Delta IV Heavy rocket lifts off from Launch Complex 37 at Cape Canaveral Air Force Station Sunday, Aug. 12, 2018. (Malcolm Denemark/Florida Today via AP)

This long exposure photograph provided by NASA, shows the United Launch Alliance Delta IV Heavy rocket as it launches NASA's Parker Solar Probe to touch the Sun, Sunday, Aug. 12, 2018 from Launch Complex 37 at Cape Canaveral Air Force Station, Florida. (Bill Ingalls/NASA via AP)

In this photo provided by NASA, The United Launch Alliance Delta IV Heavy rocket launches NASA's Parker Solar Probe to touch the Sun, Sunday, Aug. 12, 2018 from Launch Complex 37 at Cape Canaveral Air Force Station, Florida. (Bill Ingalls/NASA via AP)

In this photo provided by NASA, The United Launch Alliance Delta IV Heavy rocket launches NASA's Parker Solar Probe to touch the Sun, Sunday, Aug. 12, 2018 from Launch Complex 37 at Cape Canaveral Air Force Station, Florida. (Bill Ingalls/NASA via AP)

A Delta IV rocket, carrying the Parker Solar Probe, lifts off from launch complex 37 as seen during a time exposure at the Kennedy Space Center, Sunday, Aug. 12, 2018, in Cape Canaveral, Fla. The Parker Solar Probe will venture closer to the Sun than any other spacecraft and is protected by a first-of-its-kind heat shield and other innovative technologies that will provide unprecedented information about the Sun. (AP Photo/John Raoux)