What happened to pioneer 10

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In February 1969, NASA approved a two-spacecraft project to explore Jupiter as part of the Pioneer program managed by ARC. A year later, NASA awarded a contract to the TRW Company of Redondo Beach, California, to build the two spacecraft. The 571-pound spacecraft carried 11 instruments for the close-up study of Jupiter and interplanetary space during the journey:

Pioneer 10 used plutonium-238 in two radioisotope thermal generators (RTG) to supply power to its systems and instruments, since at the giant planet"s distance from the Sun, capturing enough solar energy would have required prohibitively large solar arrays.

For millennia, the planet Jupiter appeared to our ancestors as little more than a starlike point of light. The Romans revered it enough to name it for the lord of their gods. But not until the invention of the telescope did we discover more about it: four huge moons (and many smaller ones); the roiling Great Red Spot, a storm wider than Earth; and the planet"s sheer magnificence as the largest and most massive world in the solar system.

Half a billion miles (800 million kilometers) away, Jupiter languished at the ragged edge of human knowledge, seemingly unreachable. Then, 50 years ago today, a tiny probe roared into the Florida night to unmask this monstrous world for the first time. Pioneer 10 would teach and surprise us in equal measure, and provide a pathfinder for missions to come.

The quarter-ton, car-sized Pioneer 10 probe was designed to survey not just Jupiter but the entire solar system environment beyond Mars -- including the never-before-crossed asteroid belt -- for the first time. After passing Jupiter, Pioneer 10 would plunge into the outer solar system and ultimately leave the Sun"s realm forever.

Twice thwarted by a power cut and high winds, its Atlas Centaur rocket finally rose from Cape Canaveral"s Launch Complex 36A at 8:49 P.M. EST on March 2, 1972. Pioneer 10 started knocking down records right off the bat. It became the fastest human-made object to leave our planet, barreling away from Earth at 32,000 miles (51,500 km) per hour and passing the Moon within its first half-day of flight. It was an auspicious start for a voyage that may never end.

The craft was brimming with detectors for plasma and charged particles; cosmic-ray and Geiger-tube telescopes; asteroid, meteoroid and radiation sensors; infrared and ultraviolet scanners; an imaging photopolarimeter; and a magnetometer. To provide power in a realm where sunlight grew progressively weaker, Pioneer 10 carried four plutonium generators as the world"s first nuclear-powered deep-space probe.

Pioneer 10"s journey into the unknown was fraught with risk. On July 15, 1972, after crossing Mars" orbit, it entered the asteroid belt and for seven months traversed its 270-million-mile (434 million km) radial extent.

Such a trip had never before been attempted. But contrary to some doomsday predictions, Pioneer 10 suffered only small-scale scarring from particle impacts along the way. "Happily," noted the Baltimore Sun after the probe emerged from the belt in February 1973, "it has registered contact only with the sort of fine-grained debris that litters space in general."

Pioneer 10"s encounter with Jupiter encounter commenced in November 1973. On Nov. 25, from a distance of 7 million miles (11 million km), the craft began to detect intense radiation. It found that Jupiter"s magnetosphere -- a huge magnetic cavity carved by the planet into the solar wind -- extended 4.3 million miles (6.9 million km) toward the Sun and likely wound backward, corkscrew-like, beyond Jupiter. Its strength was far greater than Earth"s magnetosphere and tended to ebb and flow in rhythmic harmony with the planet"s nearly 10-hour rotation.

As the spacecraft drew closer, the Great Red Spot popped into view: a churning anticyclonic storm far wider than Earth. Pioneer 10 data published in April 1974 hinted that the centuries-old spot was likely a towering mass of clouds, arising from thermal sources deep within the jovian interior.

The excited fervor was palpable. "Some of us have been looking through telescopes at Jupiter since our early teens," NASA Administrator James Fletcher said. "This is more than we ever dreamed of." U.S. President Richard Nixon wired congratulations, noting that humanity"s ability to explore the heavens now sat "on the threshold of the infinite."

But Pioneer 10"s margin of survival was closer to the knife-edge than it seemed. It absorbed a thousand times the lethal dose of radiation for a human, suffering darkened optics and fried transistor circuits. Other unwanted side effects included the generation of false commands, which caused the craft to lose at least one image of the moon Io and several shots of Jupiter.