The Voyager spacecraft: Forty years in space

Fran Bagenal

In 1977, two NASA space probes, Voyager 1 and Voyager 2, launched into space destined to upend our view of the solar system forever. And when they reached Jupiter and Saturn, the images and data they sent back to Earth astounded space scientists around the globe, says CU Boulder’s Fran Bagenal, a mission scientist who began working with Voyager data as a doctoral student at MIT.

CUT 1 “It was completely nuts to see these new worlds for the first time. And each time these new images would come up on the camera and you’d be going, ‘What are we seeing now?’” (:10)

The spacecraft blasted off in August and September on different paths. Voyager 2 went on to visit Uranus and Neptune, completing NASA’s “Grand Tour of the Solar System,” perhaps the most exhilarating interplanetary mission ever flown.

CUT 2 “The thing about Voyager is that it got the first close-up view of Jupiter, Saturn, Uranus and Neptune - these four big, giant planets in our solar system - (:10) which we’d only had little glimpses of either from a telescope or from flybys that were not carrying very good cameras.” (:17)

CU Boulder scientists, who designed and built identical instruments for the spacecraft, were as stunned as anyone when the spacecraft began sending back data to Earth. What really surprised everyone, says Bagenal, were the different moons surrounding these giant planets.

CUT 3 “And we were able to see not only those planets in gory detail – the Great Red Spot, the swirling clouds and so on, as well as the rings of Saturn – but we saw the moons which were completely separate worlds. Each one very different. (:15) We thought that they’d be a bit like our moon. Like a battered bunch of rock and maybe ice. But no. What we saw were volcanoes. We saw ice that seems to be opening up. We saw plums of stuff coming out. It was just amazingly different worlds.” (:33)

And while the spacecraft were making incredible discoveries, for Bagenal there is one moment she’ll never forget. When data from the plasma science instrument started to come in, it revealed something that she had predicted in a term paper a few years before Voyager reached Jupiter.

CUT 4 “To actually start to see the data come in was just incredible because I’d written a little term paper on, ‘Well, we might see this with this instrument. Given the instrument’s capabilities, this is what the signal should look like.’ (:12) And then the day of March 6, 1979, the data was coming in on a print out. So it would print out on this thing and it would move up and it would make another wiggly line. And look at those at those wiggly lines and they were just what I predicted. And I’ll never forget that moment.” (:28)

Bagenal, who is a professor at CU Boulder’s Laboratory for Atmospheric and Space Physics, was analyzing solar wind and charged particle data as a MIT doctoral student. Little did she know that Voyager would launch a career that also has spanned 40 years.

CUT 5 “Being involved in Voyager as a graduate student just completely made my career. I got so lucky I could be involved with four different planets over a period of 12 years, just as I was starting to get into research and writing papers. Yeah, it launched my career. No question about it.” (:19)

Like many scientists, Bagenal is amazed the spacecraft are still functioning and sending data back to mission controllers on Earth. The spacecraft are traveling about a million miles per day. Voyager 1 is roughly 13 billion miles away and has punched its way into interstellar space. Voyager 2 is not far behind, but on a different trajectory that will soon take it out of the cosmic neighborhood.