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40 years and counting: the team behind Voyager's space odyssey

On a chilly March morning, Steve Howard, aged 65, is at work in his office in Altadena, California. Two computer screens are squeezed on to his corner desk along with family photos, a box of paper tissues, and tins of peppermints. The office is in a quiet business park. Next to it is a diner, where people linger for hours over a $1 coffee. If the few people walking by on West Woodbury Road were to peer into Howard's office, they might guess, seeing the graph-covered twin screens and a third PC at the other end of the desk, that he was, perhaps, a financial adviser. But what Steve Howard is actually doing makes this very ordinary scene quite extraordinary.

Howard is a NASA[1] mission controller. He is sending instructions to a probe in interstellar space, billions of kilometres from Earth. The 815-kilogram craft, Voyager 1, is one of two identical machines that for many years now have been the furthest human-made objects from Earth.

It is no hyperbole to say, then, that the man tapping away at his keyboard is a key figure in the greatest-ever feat of human exploration. There was nothing like the Voyager 1 and Voyager 2 missions to the outer planets before they launched in 1977. The machines have been travelling at around 60 000 kilometres per hour for over 40 years. The Voyagers' on-board computers are early 1970s models that were advanced then but are puny now – a smartphone's computer is some 200 000 times faster and has about 250 000 times more memory than Voyager's hardware.

The Voyager mission, originally meant to last four years, took the craft initially to Jupiter, then Saturn, then, since everything was working well, to Uranus and finally Neptune, after which they spun off into their journey around the Milky Way. 'We all knew we were on a mission of discovery,' says Professor Ed Stone, aged 79. 'We just had no idea how much discovery there would be. We just kept finding things we didn't know were there to be found. For example, before Voyager, the only known volcanoes in the solar system were here on Earth. Then we flew by Jupiter's moon, Io, which had 10 times the volcanic activity of Earth. Ten times! We detected hot lakes of lava on the surface. That was the first major discovery and it set the tone for the rest of the mission.'

Against all expectations their vintage electronics are still, mostly, working in the intense minus 253 °C cold of outer space, but the on-board camera on each Voyager was deactivated to save power in 1990. This was after Voyager 1 took a now-iconic 'family portrait' of the solar system from almost 6.5 billion kilometres out. It captured Neptune, Uranus, Saturn, Jupiter, Venus, Earth (described by the astrophysicist Carl Sagan as a 'pale blue dot') and the Sun, by then just a tiny point of light.

Engineers are not given to emotion, but the romance of this incredible voyage of discovery has, by their own account, kept the ageing mission team together. Even latecomers, who were at school when Voyager was launched, have been working on the same mission for 30 years and more.

It is clear talking to Voyager staff that they genuinely love their spacecraft, even though most were too young to see them before they flew. But as engineers, they have mixed feelings about the most famous aspect of that romance, the 'golden record' that each craft carries. This is a gold-covered copper disk containing, in groove form, 115 photos from Earth, a selection of natural sounds from surf to whales, music from a variety of cultures and eras and spoken greetings in 55 languages.

Carl Sagan, who had the initial idea for the record, wrote in the 1970s: 'The spacecraft will be encountered and the recording played only if there are advanced spacefaring civilisations in

interstellar space.' Sagan's son Nick, then an infant, now a science-fiction novelist and screenwriter, recorded the English message: 'Hello from the children of planet Earth.' But one sure to bring people to tears is the message in Mandarin: 'Hope everyone's well. We are thinking about you all. Please come here to visit when you have time.'

Project manager Suzy Dodd's view of the record is more typical of the team. 'I'm of the opinion that space is very empty and the chances of something finding it are remote. But that doesn't diminish the fact that we've got a little time capsule out there travelling through space and now orbiting around in our galaxy. And that's us.'

For the most part, Voyager is the reality of space exploration – slow, patient science, humdrum perhaps, but real. It's only a 20-minute drive from Altadena to Hollywood, where brilliant fake versions of space exploration are confected, but Voyager, starring real people who keep tissues and tins of peppermints on their desks, is surely one of the most amazing things in human history.

Glossary:
[1]NASA: the US organisation that is responsible for space exploration

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