

Zombie spaceship is coming home

The race to revive the long-lost ISEE-3 — launched in 1978 and abandoned in 1997 — began this April

KENNETH CHANG

FOR 17 years, it has been drifting on a lonely course through space. Launched during the disco era and shuttered by NASA in 1997, the spacecraft is now returning to the civilisation that abandoned it.

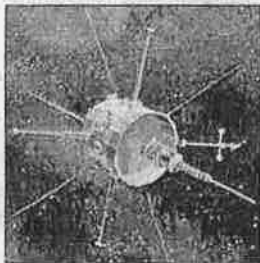
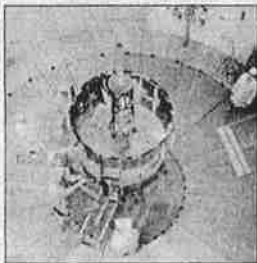
It seemed destined to pass without fanfare, except for a slight chance of slamming into the moon, and then loop aimlessly through the inner solar system. But now, a shoestring group of civilians headquartered in a decommissioned McDonald's have reached out and made contact with it.

After 36 years in space, the craft, the International Sun-Earth Explorer-3, appears to be in good

been looping around the sun on a 355-day orbit. Like a faster race car lapping the rest of the field, ISEE-3 will catch up to and pass Earth in two months.

That is exactly what Robert W Farquhar, the craft's flight director, intended. Farquhar came up with the intricate orbits that moved ISEE-3 to various locations in the solar wind. After the successful Giacobini-Zinner flyby, ISEE-3 still had ample fuel, so three rocket burns in 1986 set it on a course to zoom about 30 miles above the surface of the moon 28 years later, on August 10, 2014. The gravitational pull of the flyby would swing ISEE-3 into orbit around Earth.

In 1999, the agency upgraded



(Left) The ISEE-3 at NASA's Goddard Space Flight Centre before its launch; an illustration of ISEE-3, which was launched in 1978. NASA

working order. The main challenge, the engineers say, is figuring out how to command it. No one has the full operating manual anymore, and the fragments are sometimes contradictory.

"We call ourselves techno-archaeologists," said Dennis Wingo of Skycorp, an engineer and entrepreneur who has a track record of extracting miracles from space antiques that NASA has given up on.

The race to revive the craft, ISEE-3, began in earnest in April. Despite the obstacles, progress has been steady, and Wingo said the team should be ready to fire the engines within weeks.

NASA launched ISEE-3 in 1978. The craft orbited the sun between the sun and the Earth, allowing scientists to observe for the first time the high-speed stream of electrons and protons known as solar wind before it reached Earth. Then ISEE-3 was recruited to a different mission. It was aimed at Comet Giacobini-Zinner, passing through the tail in September 1985. NASA used ISEE-3 for a few more observations of interplanetary space before retiring it in 1997. Since then, the craft has

its Deep Space Network, the system of radio telescopes that communicates with distant space probes. The old transmitters that could talk with ISEE-3 were thrown away. But ISEE-3 was never turned off, so it was still broadcasting, waiting for its next command. In 2008, the Network listened at the faraway spot where ISEE-3 was and heard the carrier frequency of the spacecraft's radio.

Two years later, NASA looked into reviving contact for the 2014 flyby but concluded that the scientific payoff would not be worth the effort and money.

However, Wingo and Keith Cowing, the editor of NASA Watch, decided ISEE-3 was another worthy effort.

About 20 others joined the effort, including many members of the original ISEE-3 team. On RocketHub, a crowdfunding website, they asked for \$125,000 to help pay the costs. They collected nearly \$160,000, from 2,238 donors. If everything goes as hoped, ISEE-3 will end up in its original location to observe solar wind, fulfilling Farquhar's promise to return the spacecraft. **NYT**