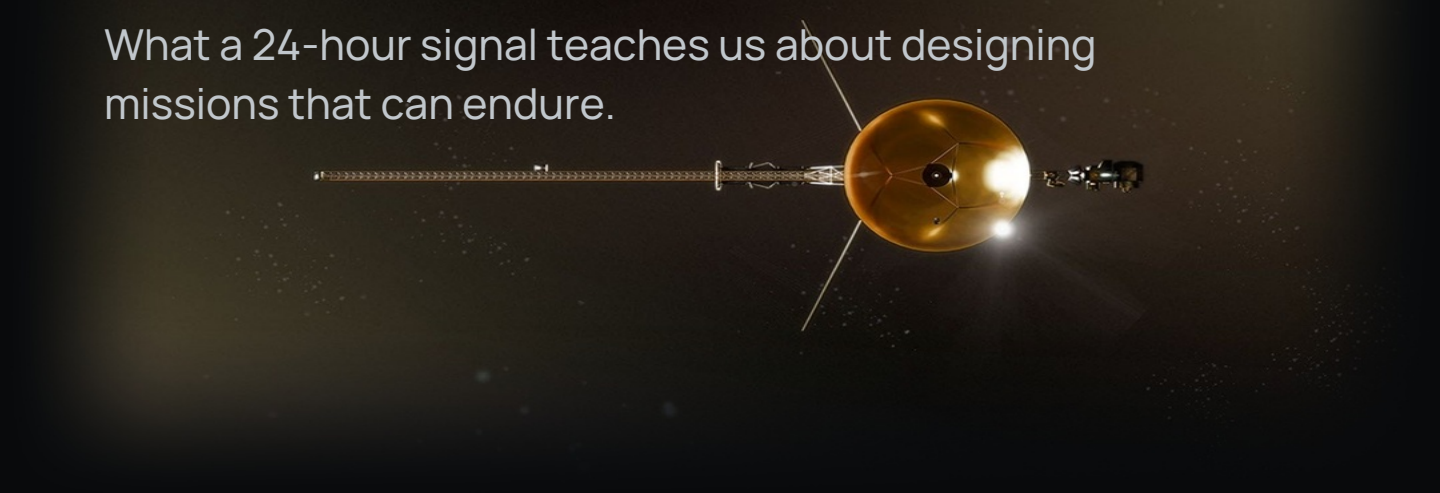
STEM / SPACE EXPLORATION / 20 NOVEMBER 2026

Voyager 1
One light-day away

What a 24-hour signal teaches us about designing missions that can endure.



Artist's concept: NASA/JPL-Caltech

25.9 billion km
FROM EARTH ON 18 NOVEMBER

24 hours
ONE WAY AT THE SPEED OF LIGHT

Source: NASA milestone confirmation · 19 November 2026

Two days to hear back

At one light-day, a radio exchange takes roughly 48 hours of signal travel alone, before processing or ground-station scheduling.



Illustrative signal timing; not a real command log.

RECEPTION IS NOT TELEMETRY

The ground team could detect a carrier signal even though science and engineering data were absent. A radio lock can establish contact without telling engineers what failed.

Sources: NASA milestone confirmation NASA Science data issue · 18 November

Signal without data

Three dates tell two distinct stories: Voyager 1 crossed a distance threshold, while engineers investigated a separate data problem.

14 NOV

DETECTION

Canberra's Deep Space Network antenna detected a carrier but no science or engineering data.

18 NOV

MILESTONE

Voyager 1 reached one light-day from Earth at 5:16 a.m. Eastern. NASA separately reported the data issue.

19 NOV

CONFIRMATION

NASA confirmed the milestone using the received carrier and trajectory calculations. The data problem remained unresolved in that update.

Sources: NASA Science data issue NASA's milestone confirmation

VISUAL INTELLIGENCE / DESIGN FOR LONG MISSIONS

Design for the wait

Three practical requirements for future deep-space systems. These are WTM design recommendations, not NASA mission commitments.

01 Give the spacecraft room to act

Rehearse safe modes and constrained onboard decisions. Write down which choices still require human approval.

02 Budget for the last usable watt

Set end-of-life priorities for instruments, heaters and communications. Preserve lower-power backups and test the changeover.

03 Treat ground stations as part of the mission

Protect antenna time, calibration records, command histories and team handovers as carefully as the flight hardware.

Context: Voyager power conservation

NASA interstellar science and ground network