SOLAR POWER EXPLORERS

The sun powers spacecraft to Earth orbit, Mars and beyond. Here's how NASA's Juno mission to Jupiter became the most distant solar-powered explorer and influenced the future of space exploration powered by the sun ▸

WHERE THEY HAVE GONE

100s
20+
20+
2
6
1
1

NASA's Juno and the European Space Agency's Rosetta are the only spacecraft to operate beyond the asteroid belt on solar power.

The Vanguard 1 satellite, launched in 1958, was the first solar-powered explorer.

GOING THE DISTANCE
NASA'S JUNO SPACECRAFT

How did Juno go where no solar-powered spacecraft has gone before?

1 Biggest Solar Panels in the Universe

It would take 1,200+ sheets of letter-size paper to cover the surface of Juno's three solar arrays, which are each **261 square feet** (24 square meters).

2 No Cell Left Unchecked

All **19,000 solar cells** (the material that makes up a solar panel) on the spacecraft were inspected to guarantee Juno performs at its best.

3 Dial It Up

Juno can dial down or up on power depending on its distance from the sun so it doesn't overload when close to the sun or become underpowered far from the sun.

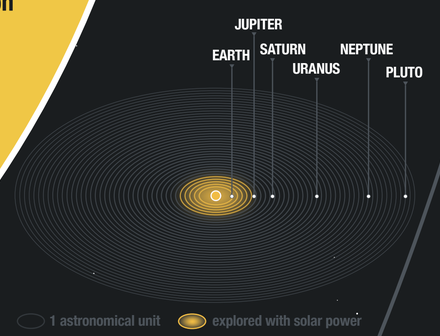
4 Rainbow Power

Similar to the tint on sunglasses, the material in Juno's solar panels picks up different kinds of light – giving them more power than average solar panels.

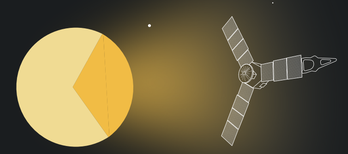
Juno surpassed Rosetta as the most distant solar-powered spacecraft while on its way to Jupiter in January 2016.

Rosetta was designed to go to the asteroid belt, but its solar panels took it much farther: 5.29 AU, 490 million miles (790 million km) from the sun.

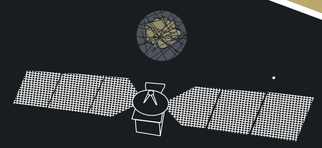
WHERE THEY WILL GO



Today's solar technology can power spacecraft out to Jupiter, about 508 million mi (817 million km) from the sun, but no farther.



Juno's state-of-the-art solar panels were nearly too massive to launch and at their best can convert 28% of sunlight into power.



To reach Saturn and beyond, solar panels of the future will need to be lighter and more efficiently convert sunlight into power. NASA's mission to Jupiter's moon Europa may be the first to use such technology.