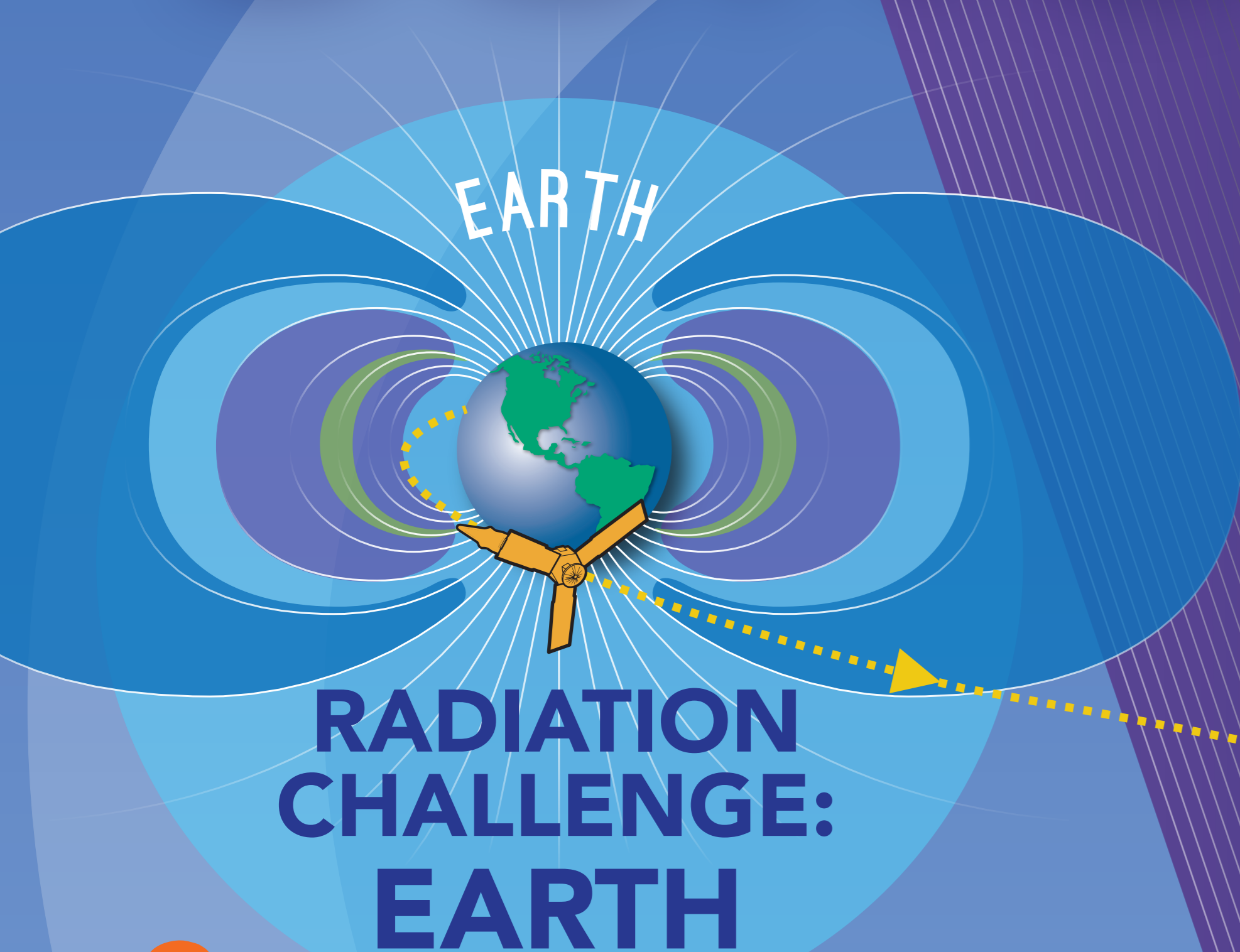


# JUNO

*Built To Withstand Intense Radiation Environments*

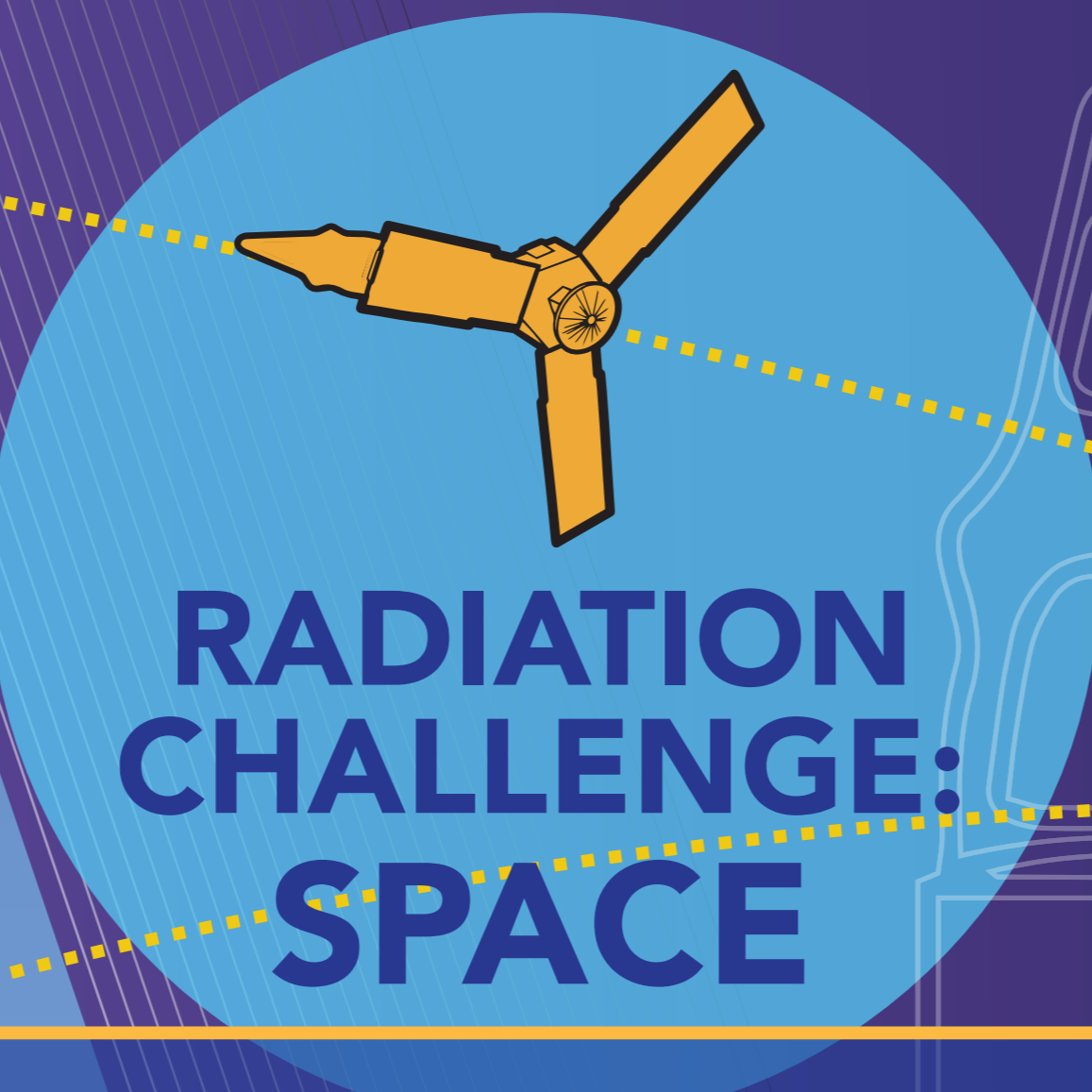


### WHAT PROBLEMS DOES INTENSE RADIATION CAUSE?

- Spacecraft and instrument degradation
- Electric charging of the spacecraft
- Noise from particles hitting detectors

### WHY DOES JUPITER HAVE SUCH INTENSE RADIATION BELTS?

- Very strong magnetic field
- **Jupiter's magnetosphere extends out 100 Jupiter radii on the sun-facing side—Earth's is only 10 Earth radii**
- In addition to the solar wind, Io's volcanic activity constantly releases gas into the magnetosphere, which gets ionized and energized, adding to the radiation



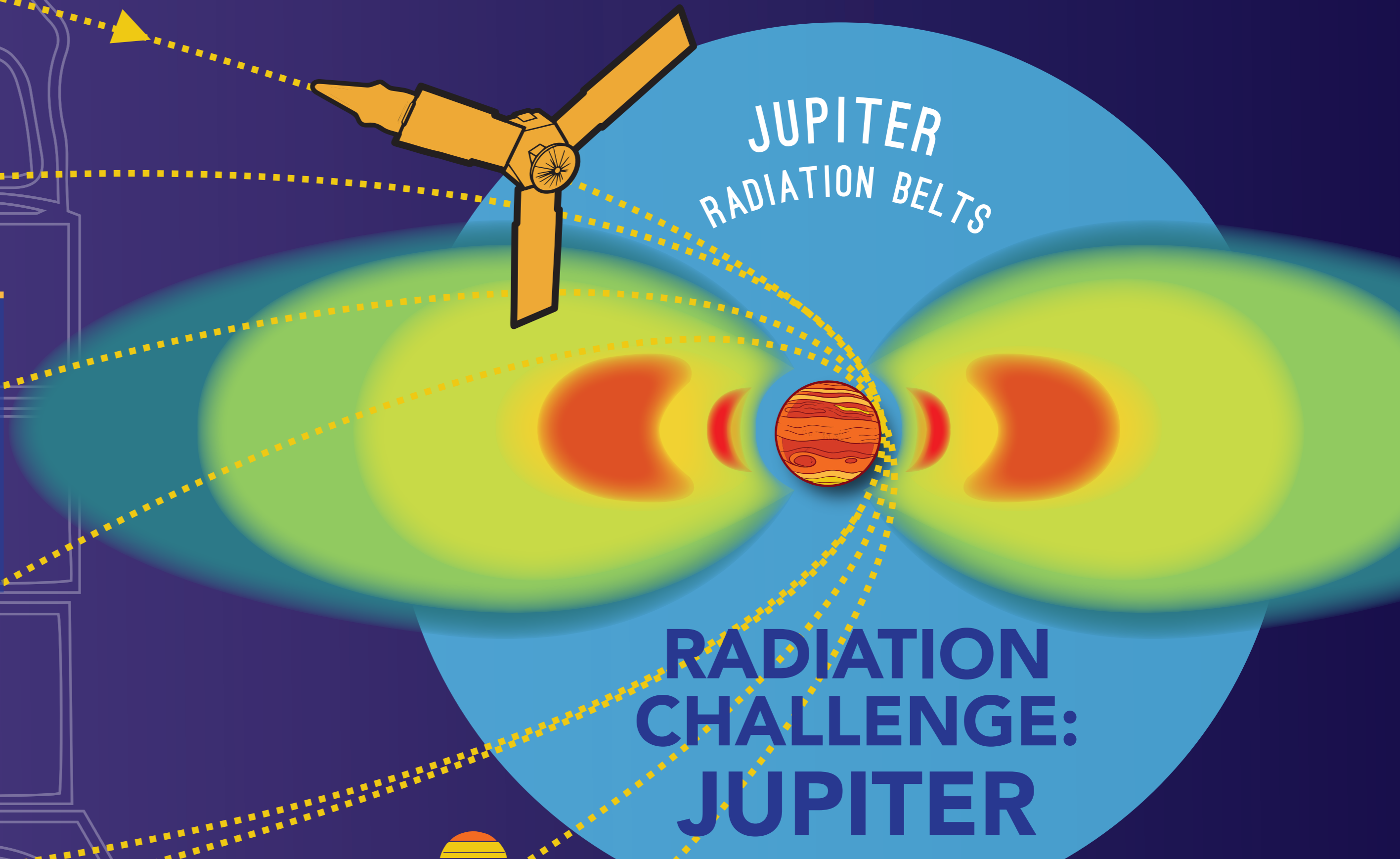
### RADIATION CHALLENGE: EARTH

Several instruments practiced making measurements in Earth's magnetosphere

### RADIATION CHALLENGE: SPACE

Radiation from...

- Solar energetic particles
- Cosmic rays from outside the solar system



### WHAT PROTECTS JUNO FROM RADIATION EFFECTS?

- Detectors and their electronics are built to withstand radiation
- Most electronics shielded in ~1/2-inch thick titanium vault
- **On the outside of the spacecraft, the star tracker's camera is about 4x heavier than even the biggest standard star trackers due to extra shielding**
- Orbit is designed to avoid most intense pockets of radiation

### RADIATION CHALLENGE: JUPITER

- Very intense radiation belts
- Particles trapped in the belts are so fast they spiral from top to bottom in only a few seconds
- **These particles are moving at nearly the speed of light!**