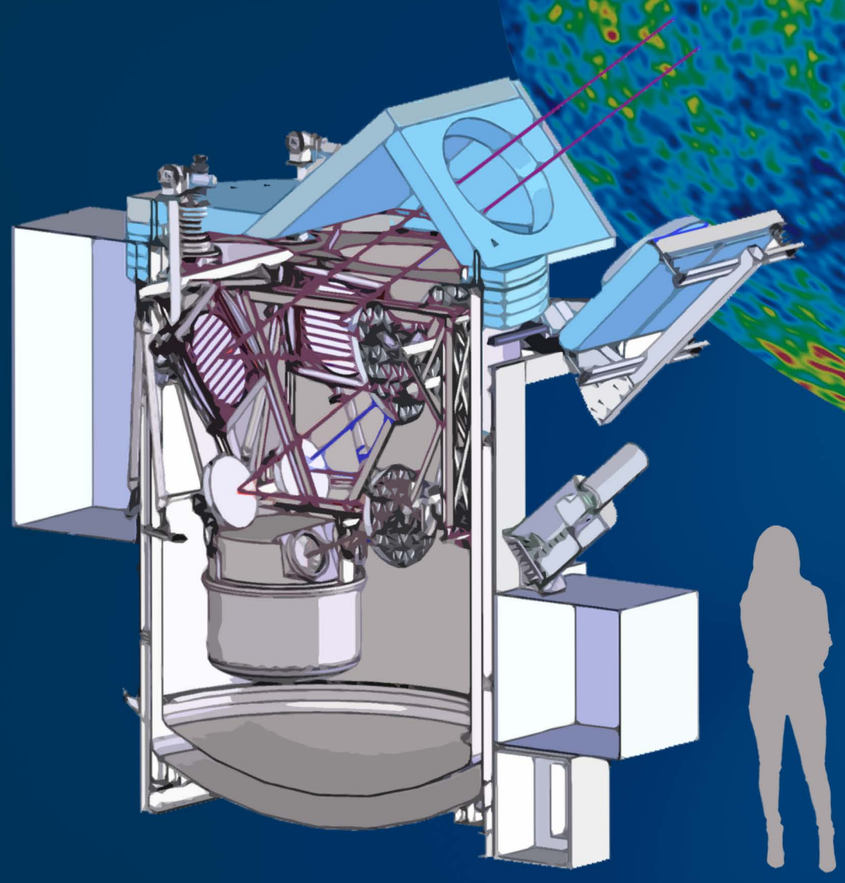
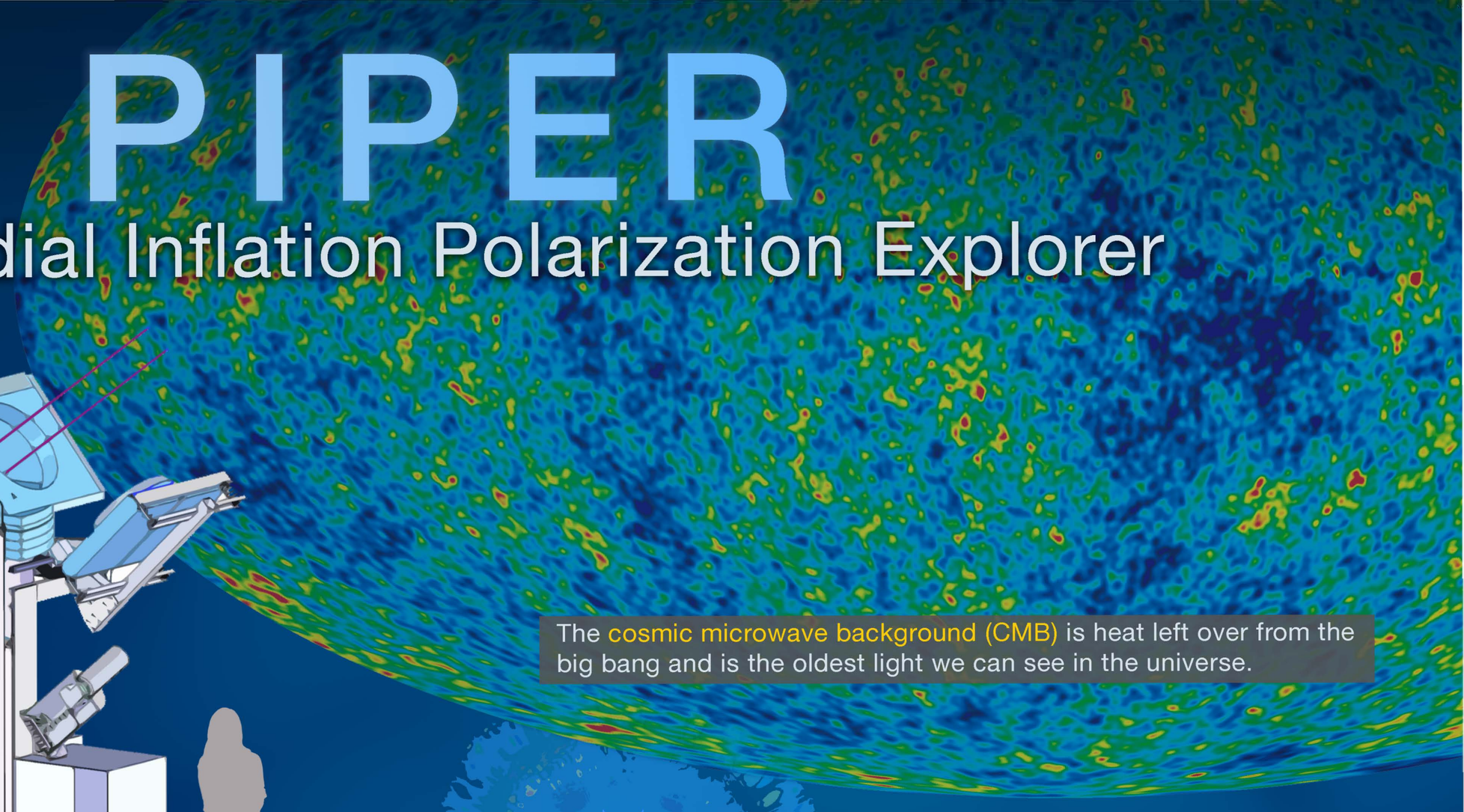
PIPER

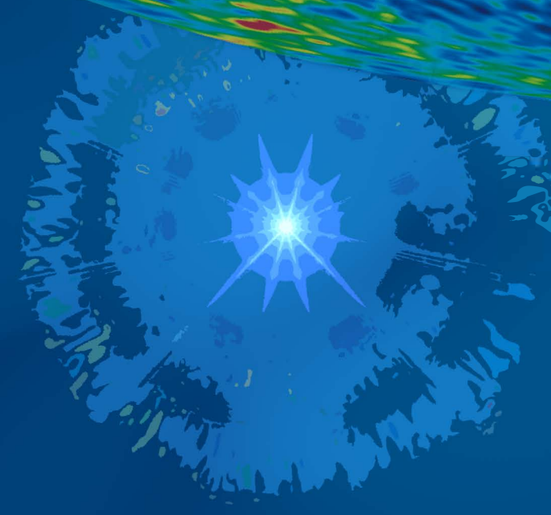
Primordial Inflation Polarization Explorer



PIPER is a microwave telescope flown on a high-altitude balloon. The instrument has twin telescopes in a hot-tub-sized container of liquid helium.



The cosmic microwave background (CMB) is heat left over from the big bang and is the oldest light we can see in the universe.



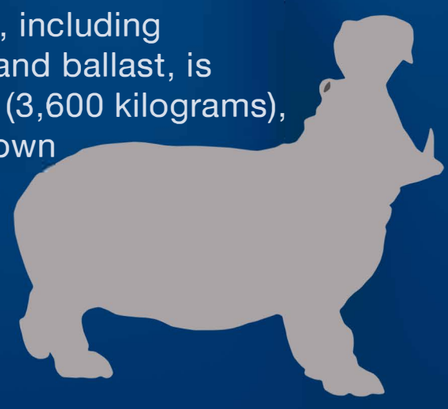
Scientists are studying the CMB for proof that the universe expanded rapidly immediately after the big bang.

This process, called inflation, should have created gravitational waves. If so, light from the CMB should contain a distinct twisting polarization pattern called B-mode.

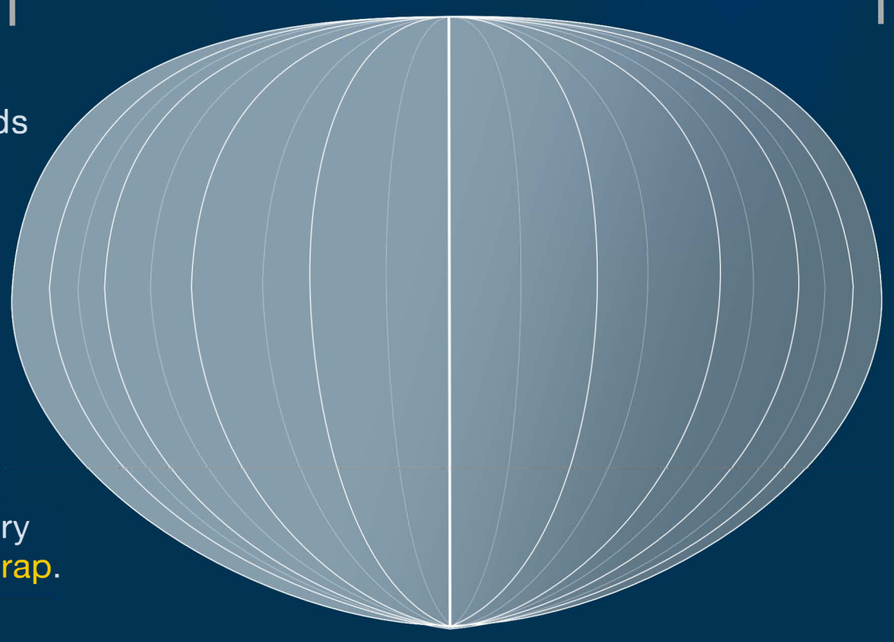
Liquid helium keeps the instrument at -452 degrees Fahrenheit (-269 Celsius).

The detectors on PIPER could spot a 60-watt incandescent light bulb in California from PIPER's base of operations at NASA's Goddard Space Flight Center in Maryland.

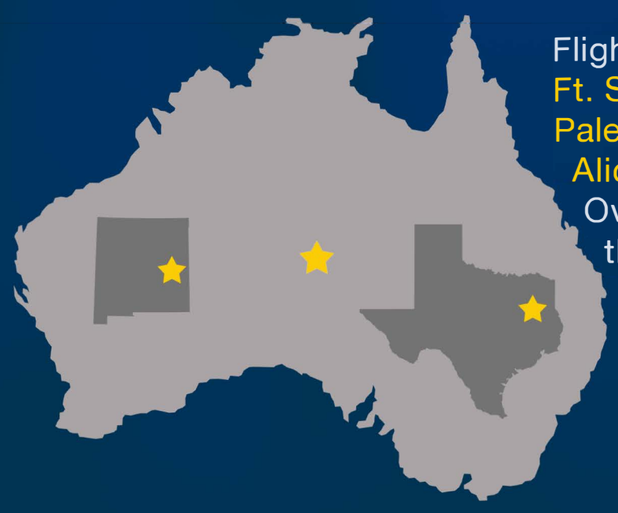
PIPER's total weight, including instrument, balloon and ballast, is about 8,000 pounds (3,600 kilograms), as much as a full-grown male hippopotamus.



Width of fully inflated balloon: 430 feet (130 meters)



The balloon expands to approximately 40 million cubic feet (1.1 million cubic meters) when it reaches maximum altitude. It's made from polyethylene film comparable in thickness to ordinary plastic sandwich wrap.



Flights are planned from Ft. Sumner, New Mexico, Palestine, Texas and Alice Springs, Australia. Overnight flights from these three locations will allow PIPER to cover 85 percent of the sky.

PIPER's maximum altitude is about 120,000 feet (36,000 meters). That's more than three times the cruising altitude of a commercial airplane.

National Aeronautics and Space Administration