

TECHNOLOGY NOTE**● The Ultimate Telescope**

The largest telescopes in the world don't depend on visible light, lenses, or mirrors. Instead, they collect radio waves from the far reaches of outer space. One radio telescope, called the Very Large Array (VLA), is located in a remote desert in New Mexico.

From Radio Waves to Computer Images

Objects in space give off radio waves that radio telescopes collect. A bowl-shaped dish called a reflector focuses the radio waves onto a small radio antenna hung over the center of the dish. The antenna converts the waves into electric signals. The signals are relayed to a radio receiver, where they are amplified and recorded on tape that can be read by a computer. The computer combines the signals to create an image of the source of the radio waves.

A Marvel at "Seeing"

Radio telescopes have some distinct advantages over optical telescopes. They can "see" objects that are as far as 13 billion light-years away. They can even detect objects that don't release any light at all. Radio telescopes can be used in any kind of weather, can receive signals through atmospheric pollution, and can even penetrate the cosmic dust and gas clouds that occupy vast areas of space. However, radio telescopes must be large in order to be accurate.

Telescope Teamwork

The VLA is an array of 27 separate radio telescopes mounted on railroad tracks and electronically linked by computers. Each of the 27 reflectors is 25 m in diameter. When they operate together, they work like a single telescope with a diameter of 47 km! Using the VLA, astronomers have been able to explore distant galaxies, pulsars, quasars, and possible black holes.

A system of telescopes even larger than the VLA has been used. In the Very Long Baseline Array (VLBA), radio telescopes in different parts of the world all work together. The result is a telescope that is almost as large as the Earth itself!

What Do They See?

Find out about some of the objects "seen" by the VLA, such as pulsars, quasars, and possible black holes. Prepare a report or create a model of one of the objects, and make a presentation to your class. Use diagrams and photographs to make your presentation more interesting.