National Aeronautics and Space Administration

The Hubble Space Telescope

AN ‘EYE’ ON THE UNIVERSE

NASA’s Hubble Space Telescope is the first major optical telescope placed into orbit around Earth. Located above our obscuring atmosphere, the telescope provides the clearest views of the universe yet obtained in visible light.

Hubble can resolve astronomical objects 10 to 20 times sharper than typically seen with large ground-based telescopes (not using adaptive optics). Also, the space telescope can view the universe across a broad swath of the electromagnetic spectrum, from ultraviolet light through visible and to near-infrared wavelengths.

Hubble’s sharp vision launched a revolution in astronomy spanning over three decades. It reveals a whole new level of detail and complexity in a variety of celestial phenomena, from neighboring planets and stars to galaxies near the limits of the observable universe. Hubble’s combined resolution and unparalleled sensitivity allows astronomers to look deeper into the cosmos in visible light than ever before. This capability provides key new insights into the structure and development of our universe across billions of years. The telescope’s spectacular pictures engage the public around the world.

Among its many accomplishments, Hubble continues expanding our understanding of how stars and planets form, helps in characterizing the atmospheres of planets around other stars, uncovers evidence of supermassive black holes, and reveals galaxies back to nearly the birth of the cosmos.

Hubble was launched into low-Earth orbit aboard the space shuttle Discovery on April 24, 1990. Hubble completes an orbit around Earth approximately every 95 minutes, transmitting its observations to ground-based tracking stations. The heart of the 27,000-pound telescope (12,200 kilograms) is the 94.5-inch (2.4-meter) diameter primary mirror. The observatory is named after the American astronomer Edwin P. Hubble,who helped discover that the universe is expanding.

Hubble has been in operation for more than three decades thanks to five NASA space shuttle servicing missions between 1993 to 2009. Astronauts replaced science instruments with more advanced versions, and repaired or replaced aging electronic subsystems. These missions have continually improved Hubble’s performance since launch. Hubble has made over more than 1.5 million observations, capturing data from more than 50,000 different targets, creating an immense database that will be an invaluable resource for astronomical research for decades to come.

VOCABULARY

Astronomer: A scientist who studies the universe and the celestial bodies residing in it, including their composition, history, location, and motion.

Spectrograph: An instrument that spreads light into its component colors for detailed study.

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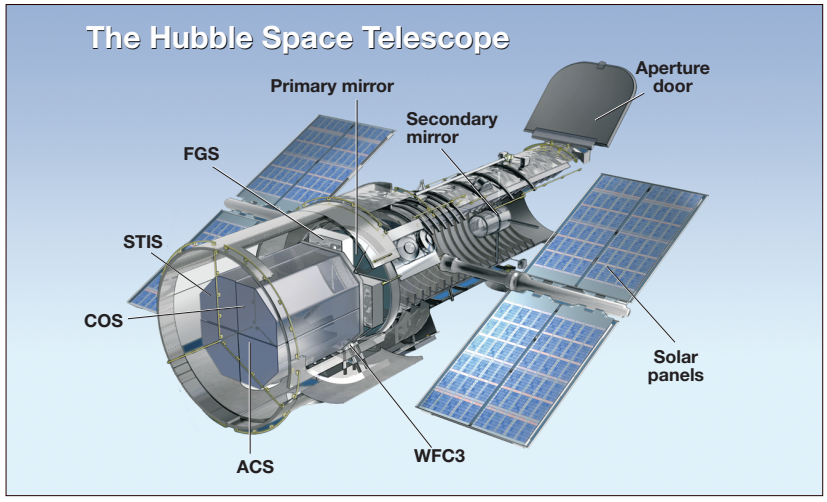

Hubble Space Telescope observations are made with a suite of science instruments, which serve as astronomers’ eyes on the universe. The telescope is equipped with spectrographs and cameras sensitive to ultraviolet, visible, and infrared light. Once the telescope observes a celestial object, onboard computers beam the data to Earth via communications satellites. The data is then archived, calibrated, and delivered to scientists to study.

Illustration credit: NASA

FAST FACTS

Telescope Statistics

Length: 43.5 feet (13.3 meters)
Primary mirror diameter: 94.5 inches (2.4 meters)
Orbit: About 335 miles (540 kilometers)

Active Instruments

- Wide Field Camera 3 (WFC3)
- Cosmic Origins Spectrograph (COS)
- Space Telescope Imaging Spectrograph (STIS)
- Advanced Camera for Surveys (ACS)
- Fine Guidance Sensors (FGS)

Credit for Hubble image: NASA

For images and information on the Hubble mission, go to **www.nasa.gov/hubble**. You can get images and news about the Hubble Space Telescope on our website, **hubblesite.org**. Follow the Hubble mission on social media: ***@NASAHubble***.