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12/9/15
A103
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The Hubble Space Telescope (HST) is a large and versatile telescope currently orbiting the Earth. Hubble's orbit is outside the Earth's atmosphere, providing the ability to capture high-resolution images with little to no distortion or background light. Equipped with various instruments designed for recording images of space and sending them back to Earth, the Hubble Space Telescope has captured some of the most detailed images of visible-light in history. Some of the images taken by the Hubble Space Telescope have been responsible for advancements in astrophysics. These extremely detailed images have allowed astronomers and people in general deep insights into the state of our solar system and surrounding galaxies that would be otherwise impossible for the inhabitants of Earth.

The notion of an orbiting space telescope had peaked the interest of astronomers as early as 1946, when Lyman Spitzer proposed two major advantages of a space telescope in his paper, "Astronomical advantages of an extraterrestrial observatory" (4). First, the angular resolution would be unaffected by the atmosphere, which was known by astronomers to be what causes the 'twinkling' of stars. Second, a telescope in outer space would be able to observe types of light that are normally absorbed by Earth's atmosphere, such as ultraviolet light. Astronomers had already been using observatories with extremely large telescopes situated atop mountains and in isolated locations far from civilization in hopes of slightly reducing atmospheric distortion. After World War II, scientists were able to utilize the developments of modern rocket technology to seriously consider new methods of observing images in space. NASA launched the Orbiting Solar Observatory (OSO) in 1962 to obtain spectra of different light types, and the Orbiting Astronomical Observatory 2 (OAO-2) in 1968 to observe stars and galaxies in ultraviolet light (5). The success of the OSO and OAO missions encouraged NASA to pursue the future of space-based astronomy, and planning for a large space telescope (LST) began in 1968 (3). Due to the projected life span (15 years) of the proposed LST, it became clear

that the LST's instruments would require the ability to be replaced or serviced both on the ground and in orbit. Thus, NASA and contractors proposed a Space Shuttle, or a reusable vehicle that could travel into orbit and return to Earth intact repeatedly (3). The space shuttle would act like a launching pad for the LST in space, deploying or retrieving the telescope as necessary. In the spirit of innovation, the Space Telescope was renamed the Hubble Space Telescope, after astronomy pioneer Edwin Powell Hubble in 1983 (3).

Construction of the HST and Space Shuttle's various components were distributed among many large institutions, including Perkin-Elmer. Perkin-Elmer was tasked with the design and construction of the Optical Telescope Assembly (OTA) and Fine Guidance Sensors for the HST (5). The telescope was designed as a Cassegrain reflector with two hyperbolic mirrors polished to astonishingly exact specifications. Optical telescopes tend to have mirrors polished to an accuracy of roughly one tenth of the wavelength of visible light, but since the HST was designed for observing visible light through ultraviolet, the mirrors had to be polished within an accuracy of 10 nanometers (1). The telescope was assembled and ready for deployment by 1985, but was severely delayed by the failure of the Challenger launch in 1986. Scientists performed extensive testing on the HST, and continued to improve its systems and instruments, such as the solar panel technology, until the Space Shuttle Discovery launched from earth with the HST in tow on April 24, 1990 (3). In the years after launching Hubble, the images captured by the space telescope were out of focus, and of a much lesser quality than expected due to an error in the curve of the main mirror, causing spherical aberration (blurring) of images. In 1993 (3), the first of 4 servicing missions launched and successively improved the systems and image quality of the Hubble by installing corrective optics, as well as new software and cameras. The next year, the HST was able utilize it's improved imaging quality to observe pieces of the Comet Shoemake-Levy 9 colliding with Jupiter's atmosphere (3). In 1998, Hubble's images helped support the theory that the Universe is not only expanding, but also accelerating, by providing accurate measurements for the luminosity of stars (3). Today, the Hubble Space Telescope is still in orbit, outliving its originally planned lifespan, and continuing to unveil the unseen depths of space.

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