The Hubble Space Telescope and accessing its archives. by Treeves

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Edwin Hubble was an American astronomer whose ideas profoundly changed the understanding of the universe. He found that the galaxies were moving away from each other and came up with a mathematical description; now know as the Hubbleâ€™s law. In his honor, NASA launched an observatory called the Hubble Space Telescope.

Observatories on Earth have distortions due to atmospheric diffraction. In order to over come this, a telescope in space was necessary. Hubble Space Telescope was on Discoveryâ€™s payload and was deployed into low Earth orbit in the year 1990. The telescope costed $2.5 billion. Within weeks since launch, the returned images showed that there were serious problems with the optical system. Though the first images appeared to be sharper than those of ground-based telescopes, Hubble failed to achieve a final sharp focus and the best image quality obtained was drastically lower than expected.

Analysis of the flawed images showed that the cause of the problem was that the primary mirror had been ground to the wrong shape. Although it was probably the most precisely figured mirror ever made, with variations from the prescribed curve of only 10 nanometers. NASA and the telescope became the butt of many jokes. Astronomers immediately began to seek potential solutions to the problem that could be applied at the first servicing mission.

Working backwards from images of point sources, a new optical component with exactly the same error but in the opposite sense was decided to be added at the servicing mission, effectively acting as "spectacles" to correct the spherical aberration. The telescope had always been designed so that it could be regularly serviced, but after the problems with the mirror came to light, the first servicing mission assumed a much greater importance, as the astronauts would have to carry out extensive work on the telescope to install the corrective optics. The seven astronauts selected for the mission were trained intensively in the use of the hundred or more specialized tools. Hubble had been serviced five times.

Since then, the Hubble has helped to resolve some long standing problems in astronomy, as well as turning up results that have required new theories to explain them. Over 9,000 papers based on Hubble data have been published in peer-reviewed journals. Anyone can apply for time on the telescope; there are no restrictions on nationality or academic affiliation.

Of the many images Hubble has shot, the Ultra-Deep Field is the most notable. It is an image of a small region of space in the constellation Fornax. A region so small that it is only one-tenth of the diameter of the full Moon as viewed from Earth, smaller than a 1 mm by 1 mm square of paper held at 1 meter away. The data was accumulated over a period from September 2003 through January 2004. It is the deepest image of the universe ever taken.

The Space Telescope Science Institute is responsible for the scientific operation of the telescope and delivery of data products to astronomers. Approximately twice daily, the Hubble Space Telescope radios data to a satellite in geosynchronous orbit. The satellite then downlinks the data to one of two 60-foot diameter high gain microwave antennas. Hubble data is eventually made available through the archives at the Space Telescope Science Institute and European Space Organization. Data is usually proprietary, available only to the principal investigator and the designated astronomers for one year after being taken.

After a year, the data and images are on public domain. Apart from the scientific nature of the data,

the Hubble pictures are surreal. They have an aesthetic value. The Hubble images have a large resolution and the are best when accessed over high speed Internet connections like Xfinity Internet.

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Tina is a freelance writer and blogger. She enjoys writing about astronomy archives and ccessing them through some of the popular highspeed internet service providers like a Xfinity Internet.

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