

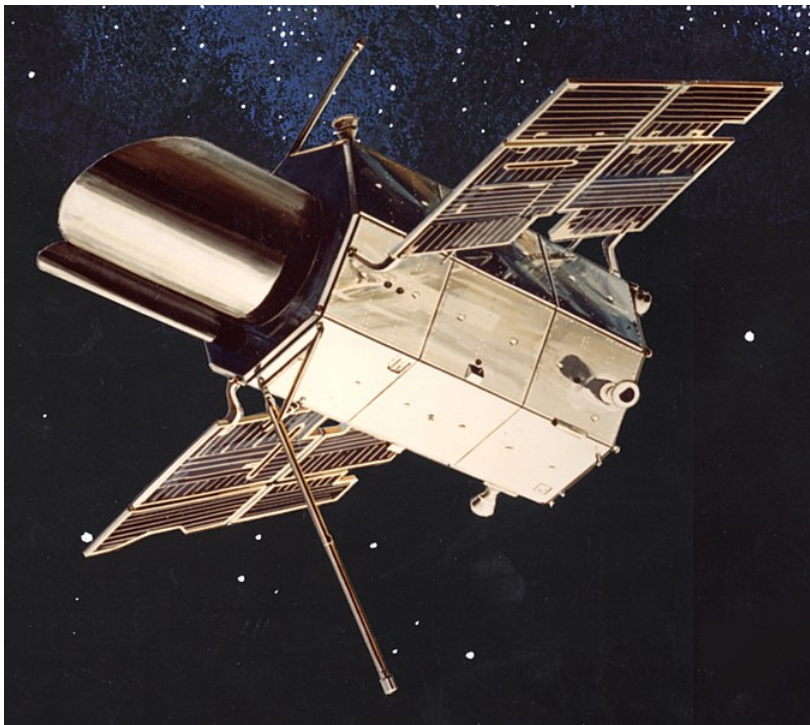
## 9.2: Hubble Space Telescope

### Hubble Space Telescope

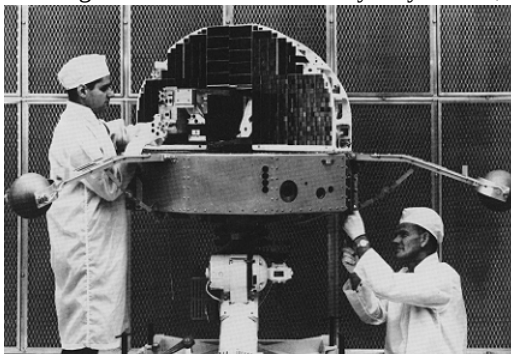
Perhaps the best known unmanned spacecraft is the Hubble Space Telescope, HST, launched in 1991 and still fully operational. Even though the HST was not the first space telescope, it is by far the most famous and productive to date. The images returned by the HST are often beyond words. They give astronomers and stargazers a look at the Universe in detail never seen before.

The idea of a space telescope was first mentioned in writings in 1923 by German rocket pioneer Hermann Oberth. The direct link to what is now known as the Hubble Space telescope can be traced directly to Lyman Spitzer, an astronomer, who wrote in 1946 of the advantages such a space-based telescope would have. Being above Earth's atmosphere would allow such a telescope to "see" without any atmospheric interference. And, the telescope could observe in the ultraviolet and infrared ranges of the spectrum; these wavelengths are mostly blocked by the Earth's atmosphere; a good thing for humans but a bad thing when one is trying to study and understand the Universe.

Progress was made in the 1960's towards the development and launch of a large space-based telescope. First, NASA launched a space telescope 1962 specifically to study the Sun, the Orbiting Solar Observatory. And in 1966, NASA launched the first telescope, the Orbiting Astronomical Observatory.



Artist's concept of the Orbiting Astronomical Observatory in orbit. Four OAOs were built and launched as a part of the program. [ "Orbiting Astronomical Observatory " by NASA, in the [Public Domain](#) ]



Two technicians work on the Orbiting Solar Observatory, before launch. [ "OSO4 " by Uwe W ., in the [Public Domain](#) ]

With the experience and knowledge from the OSO and OAO missions, NASA began planning for a larger, longer term space telescope. The concept for the Large Space Telescope was that it features a 3 meter-diameter primary mirror (about 118 inches) and be placed into orbit by the under-development Space Shuttle as early as 1979.

As is often the case, funding became an issue, so the Large Space Telescope's primary mirror was reduced in size from 3 meters to 2.4 meters (about  $94 \frac{1}{2}$  inches). Additionally, the European Space Agency was brought on as a partner of the Large Space Telescope. The proposed launch was pushed way back from the original 1979 target, due to both Space Shuttle and Large Space Telescope developmental issues.

In 1983, the Large Space Telescope was renamed the Hubble Space Telescope, to honor Edwin Hubble for his work in astronomy and specifically Hubble's discovery that the Universe is expanding. One of the key objectives for the HST was to determine the rate at which the Universe is expanding.

Development and construction of the HST took longer than planned, yet finally a launch date was set: October 1986. With the Challenger tragedy January 28, 1986, all shuttle launches were stopped until the Space Shuttle could undergo major modifications. Finally, on April 24, 1990, the HST was flown into orbit aboard Space Shuttle Discovery and successfully deployed on orbit.



American astronomer Edwin Hubble, at the eyepiece of the 100-inch telescope at Mount Wilson (California, USA). [” [Edwin Hubble](#)” by NASA & ESA is licensed under [CC BY 4.0](#) ]



The HST, after a Space Shuttle Discovery servicing mission, with Earth in the background. [” Hubble 01 ” by NASA, in the [Public Domain](#) ]

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