

Telescope Source Information for Images on Galaxy Cards

ASTRO-1: these images were gathered from telescopes mounted on board a Space Shuttle. Three different ultraviolet telescopes were mounted in the payload of the Space Shuttle Columbia and made 231 observations over a 9-day period (Dec. 2nd-11th, 1990)

ASTRO-2: a follow-up project to ASTRO-1, these images were also gathered from telescopes that were carried on board a Space Shuttle. This time, the same three UV telescopes were mounted on the Space Shuttle Endeavour. They made several hundred observations over a 16-day period (March 2nd-18th, 1995), which set the record for the longest shuttle mission at the time.

GALEX: The Galaxy Evolution Explorer (GALEX) is an orbiting space telescope that observes galaxies in ultraviolet light across 10 billion years of cosmic history. With sensitive ultraviolet detectors, a large field of view, and its location above the ultraviolet-absorbing atmosphere of the Earth, GALEX is able to do one-of-a-kind observations, including an extra-galactic all-sky survey.

NRAO: The National Radio Astronomy Observatory is an organization that designs, builds and operates the world's most sophisticated and advanced radio telescopes. They gather info from hundreds of radio telescopes from all around the world working in unison. Radio telescopes are typically very large dishes (like in the movie *Contact*, which has scenes filmed at a the VLA [see below] and at the 300-m (1,000 ft.) Arecibo telescope in Puerto Rico – the largest in the world).

VLA: The Very Large Array, one of the world's premier astronomical radio observatories, consists of 27 radio antennas in a Y-shaped configuration on the Plains of San Agustin fifty miles west of Socorro, New Mexico. Each antenna is 25 meters (82 feet) in diameter. The data from the antennas is combined electronically to give the resolution of an antenna 36km (22 miles) across, with the sensitivity of a dish 130 meters (422 feet) in diameter. Most people will recognize from the movie *Contact*. It is operated by the NRAO.

NVSS: The NRAO VLA Sky Survey (see above) is a huge survey of the sky done in radio wavelengths. Completed by the NRAO using the VLA, the information gathered is provided free to the entire astronomical community to help advance science.

RAIUB/MPIFR: The Radio Astronomical Institute of the University of Bonn and the Max-Planck-Institute for Radio Astronomy are German institutions that use a 100-meter radio telescope located in a protected valley in western Germany (near Effelsburg). The combination of the high surface accuracy of the dish and the construction principle of 'homologous distortion' enables observations at unprecedented high frequencies for such a large telescope. The telescope can be used to observe radio emission from celestial objects in a wavelength range from 73cm (408MHz) down to 3.5mm.

Effelsburg: see above (RAIUB/MPIFR)

AAO: The Anglo-Australian Observatory, located in Australia, houses a 4-meter equatorially mounted telescope. Its excellent optics, exceptional mechanical stability and precision computer control make it one of the finest telescopes in the world. Like most telescopes, the AAT can be used in many configurations, each requiring a different instrument or detector to collect and analyze the light. Most astronomers use charge coupled devices (CCDs) to collect data. These highly sensitive solid-state devices convert feeble light into digital signals that are then collected and stored on computers for further analysis, rather like an electronic photograph.

Grasslands Observatory: this is a small, privately owned, observatory located in Southeastern Arizona. It houses a 0.6-m (24-inch) reflecting telescope that is well suited for optical astronomy.

IAC/RGO/Malin: This image was actually taken using the Isaac Newton Telescope, located in La Palma, Spain. It has a 2.5-m (100-inch) primary mirror.

KPNO: The Kitt Peak National Observatory is located near Tuscon, Arizona. KPNO has 19 optical/infrared telescopes and two radio telescopes onsite. It supports the most diverse collection of astronomical observatories on Earth for nighttime optical and infrared astronomy and daytime study of the Sun. The visual image from KPNO used in this activity was taken on a 0.9 meter telescope.

The other images were taken by amateur astronomers whose info is not available – Amateurs help out a lot!