

The following article prepared by NASA Marshall Space Flight Center Historian Mike Wright appeared in 1993 in *Research and Technology, Annual Report of the Marshall Space Flight Center* which was dedicated to the Skylab Space Station Program.

# Salute to Skylab

# Skylab

## America's First Space Station

The *Skylab* program objectives were to prove that humans could live and work in space for extended periods, and to expand knowledge of solar astronomy and Earth resources. *Skylab*'s three different three-man crews spent a total of 171 days, 13 hours in Earth orbit, and performed more than 300 experiments.

The Marshall Center provided the four Saturn launch vehicles, directed many of the *Skylab* experiments, and developed all of the major *Skylab* components, including the *Skylab* workshop. Marshall worked closely with the prime contractor for the workshop unit to convert a Saturn IVB stage into a habitable module containing crew quarters and support systems, as well as some experiment area. Marshall Center employees built portions of the *Skylab* Apollo Telescope Mount in-house and worked closely with several contractors on a very precise attitude and pointing control system. This telescope became the first manned astronomical observatory designed for solar research from Earth orbit.

The Marshall Center was also closely involved in the design, development, and test activities for the *Skylab* airlock module. The module was attached to the forward end of the *Skylab* workshop and enabled crew members to make excursions outside the space station. In addition, Marshall Center workers designed and built the structure for the multiple docking adapter. The adapter, which was attached to the forward end of the airlock module, provided the docking port for the Apollo command and service module, the spacecraft that ferried each three-member crew from Earth to the space station.

The unmanned *Skylab* workshop/Apollo Telescope Mount combination was launched on May 14, 1973, by the Marshall-developed Saturn V—America's most powerful rocket. Unfortunately, trouble began approximately 63 seconds after the launch when a huge panel protecting the orbital workshop from micrometeoroids and solar radiation ripped off. Adding to the trouble, one of the solar arrays for providing power to the workshop was torn away, and a second array was only partially deployed.

All this meant one thing—the launch of the first *Skylab* crew, scheduled for May 15, would be delayed until methods could be devised to repair and salvage the workshop. Some troubleshooting teams at the Marshall Center and other NASA centers did not leave their posts for days. Finally, on May 25, the astronaut crew—prepared to implement NASA's plan to repair the workshop—was launched.

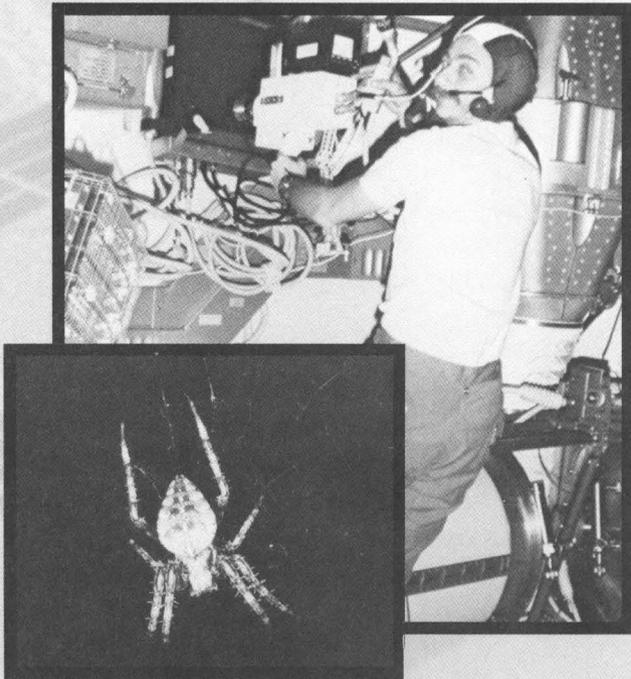


*Skylab*'s telescopes logged 8½ months of solar observations, compared to less than 80 hours from all natural eclipses since 1839, when photographic records were begun.

As a result, the first *Skylab* mission was able to continue. The crew gathered data on some 80 percent of the planned solar experiments. They also achieved a major scientific accomplishment by monitoring a solar flare. They completed 11 of 14 planned Earth resources data runs and conducted a total of 16 medical experiments. The astronauts also gathered data from five student investigations before splashing down 28 days later, on June 22, 1973.

The second manned *Skylab* crew was launched on July 28, 1973. By the tenth day, the crew was devoting about 19 hours a day to scientific experiments, but a week to 10 days later they were doing 27 to 30 hours of experiments each day. Although 26 Earth resources experiment passes had been planned, 39 were actually accomplished. In addition, some 206 hours of solar viewing had been planned, while 305 were logged. The medical experiments had included 327 planned runs, while 333 were accomplished. The mission also included the first orbital demonstration of astronaut-maneuvering equipment and a pair of common spiders, Arabella and Anita, were on board to determine their ability to spin webs without the influence of gravity, which they did once they grew accustomed to their new environment. The second manned *Skylab* mission ended September 25, 1973, after 59 days in space.

A Saturn IB rocket carrying the third crew lifted off November 16, 1973. The astronauts continued the *Skylab* in-flight experiment program, including four extravehicular activities and the observation and documentation of the newly discovered Comet Kohoutek. The third crew also served as the source for important new medical data on how humans react to weightlessness in space. The mission ended after 84 days, on February 8, 1974, setting a new endurance record and reflecting our ability to live and work in space for extended periods of time.



Astronaut Garriott operates a camera used for Earth observations. (Inset) Anita was one of the two spiders that flew as part of a student experiment investigating the role of gravity in web making.