

# **ACTS Final Curtain Call**

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Far exceeding its planned 24-month mission, the Glenn-managed Advanced Communications Technology Satellite (ACTS) concluded its extensive experiments program on May 31 after 81 months of operations.

Launched in September 1993 as a partnership among NASA, industry, and academia, ACTS opened the door for U.S. satellite communications technology in demonstrating the use of high frequency Ka-band (30/20 GHz). Until ACTS, this frequency was virtually unused—the majority of communications satellites used lower frequency bands called C- and Ku-Bands. Exploring Ka-band technology was designed to relieve orbital crowding and demonstrate the first band of frequency wide enough to carry simultaneous services ranging from multiple voice, video, and data communications to computer connections at optical fiber data rates.

"The ACTS Experiments Program has been an outstanding research and development achievement that resulted in a unique operational capability for the Center and the Agency," said Center Director Donald J. Campbell.

NASA Administrator Daniel R. Goldin affirmed: "This is what government-sponsored science can do well—pioneering advances that are beyond the scope of individual companies, but can be utilized by these companies to bring benefits to the public beyond their expectation."

Throughout its impressive lifespan, ACTS opened new frontiers by utilizing a hopping spot beam antenna system that generated 51 tightly focused spot beams. Each spot beam typically had a diameter of 150-200 miles and was able to "hop" from one location to the next, covering up to 40 locations in a millisecond. Concentrating satellite power in such a way permitted significantly smaller and less expensive Earth stations. In addition, the spot beam was better able to penetrate through rain and mitigate rain fade.

"The ACTS Experiments Program had the foresight to step beyond the conventional thinking and prove the technology needed for the future, as well as the present," said NASA Associate Administrator for Space Flight Joseph H. Rothenberg.

The ACTS Experiments Program has achieved remarkable milestones with 103 experiments and numerous demonstrations involving over 200 diverse partners, paving the way for the next generation of communications satellites. It succeeded in areas as varied as advanced networking, medicine, education, defense, emergency response, maritime and aeronautical mobile communications, and science and astronomy.

"The timeliness of ACTS technologies could not have been better," said Robert Bauer, Glenn's ACTS project manager. "Had they arrived too early, few would have been ready to utilize the bandwidth being offered. Had they arrived too late, fiber may have completely shadowed the satellites' consideration in offering wideband services to diverse and remote locations."

In recognition of ACTS contributions, the first day of the sixth annual International Ka-band Utilization Conference-held May 31-June 2 at The Renaissance Hotel, Tower City Center, Cleveland-was dedicated to ACTS. The day included technical presentations and experimental results followed by an evening celebration and special program to commemorate the conclusion of the ACTS Experiments Program.

"The ACTS Conference was a fitting and likewise superbly conceived and executed tribute to ACTS, which demonstrated the same skill and dedication as the project itself," said Glenn Acting Deputy Director Gerald Barna. "I want to commend the entire team for their efforts!"

Over the years, Glenn's Space Communications Office has maintained primary responsibility for the ACTS Program. Notably, two prime contractors, Lockheed Martin (system operations) and COMSAT Laboratories (master control operators of the communications payload), made significant contributions to the program. Local contractors-Zin Technologies, Analex, and GTE Technology-have played valuable roles as well. ACTS successes have been recognized through numerous awards including induction into the U.S. Space Foundation's Space Technology Hall of Fame in 1997, an R&D 100 Award in Significant Technology in 1995, and the prestigious Federal Technology Leadership Award in 1995.

Bauer explained that while the ACTS Experiments program has been shut down, the hardware has not been disabled. This month, the spacecraft will be moved to an orbital gravity potential well at 105.2 degrees West Longitude where it will be monitored for two months to ensure that it has settled into its final orbital slot. After the final location has been verified, the system will be "inerted," meaning that any remaining fuel will be feathered, batteries will be shorted, and momentum wheels will be despun.