Celebration At Plum Brook

Ten-Year Wind Turbine Program Sets Stage For Future

By David A. Spera, Wind Turbine Project Office

On a cold and windy autum day at Plum Brook in October 1975, before a crowd of 300 NASA staff and invited guests, the then NASA Administrator, Dr. James C. Fletcher, and the administrator of the Energy Research and Development Administration, pressed a large red button and started up the governments' first research wind turbine in the U.S.

Last month, over 100 Lewis and Plum Brook Test Station members of NASA's wind turbine family gathered at the Sandusky, Ohio site to commemorate the 10th anniversary of the event and to usher in the second decade of research on large wind turbines at Plum Brook.

First in the U.S.

The Mod-O research wind turbine located at Plum Brook was the first utility-sized wind power research test facility in the nation when it was dedicated in October 1975. Designed, built and operated by NASA Lewis for the U.S. Department of Energy (DOE), its purpose was to develop the technology needed to make wind power a viable alternate source of energy for the country.

At the time, little was known about wind machines capable of generating megawatts of power in an efficient, cost-effective and safe manner. Ronald L. Thomas, who was the first manager of Lewis' Wind Energy Project Office and currently is Director of the Space Station Directorate, remarked, "Not only were the solutions to the problems unknown, but no one knew what the problems themselves were."

What was needed was a test turbine large enough to represent the giant machines that might eventually be needed, but also small enough to be economical to change as the technology developed. The result was the Mod-O, 125 feet in diameter, atop a 100-foot tower.

"Over the years, the Mod-O became the symbol of the U.S. large wind turbine energy program around the world," said Joseph M. Savino, one of the charter members of the Wind Energy Project Office. "At every international conference and workshop, everyone wants to know what's new at Plum Brook."

New blades, towers, generators and automatic control systems all have been tested for the first time on the Mod-O and then incorporated in advanced wind turbines around the world.

Currently, the turbine is being operated with a one-bladed rotor, balanced with a counterweight.

"We get a lot of comments about its unusual appearance," said Lewis' Robert D. Corrigan, who recently presented a paper on the advantages of a turbine with one blade. "We get almost as much power as two blades and save the cost of one of the

Pioneers Cited

At recent ceremonies, Henry G. "Hank" Pfanner, who has been responsible for all wind turbine testing at Plum Brook since the machine was constructed, received a citation for "outstanding management and operation of the Mod-O wind turbine research facility from 1975 to 1985."

In presenting the citation, Darrell F. Baldwin, Manager of the Wind Energy Project Office, noted, "Hank and his operations team carried out pioneering research testing for which there was little or no precedent. Hank's example was always one of dedication, efficiency and friendship."

Citations also were given to Robert D. Corrigan, Dean R. Miller, Clinton B. Ensworth II and Richard D. DeMiglio, who authored and co-authored wind turbine reports nominated for the Outstanding Lewis Research Paper of 1984, based on Plum Brook tests.

Toward the Future

In January 1986, operation of the Plum Brook wind turbine facility will be transferred to DOE's Solar Energy Research Institute.

"We have been planning this transfer for about two years," said Baldwin, "so the Mod-O testing can continue without a break."

Support service personnel from Sverdrup Technologies and Teledyne Isotopes, who received training and experience during the NASA program, will continue to run the turbine.

While the Mod-O research will no longer be conducted by Lewis, other wind energy projects—such as the construction and testing of the 3.2 megawatt Mod-5B in Hawaii, will continue to be managed by NASA Lewis. □

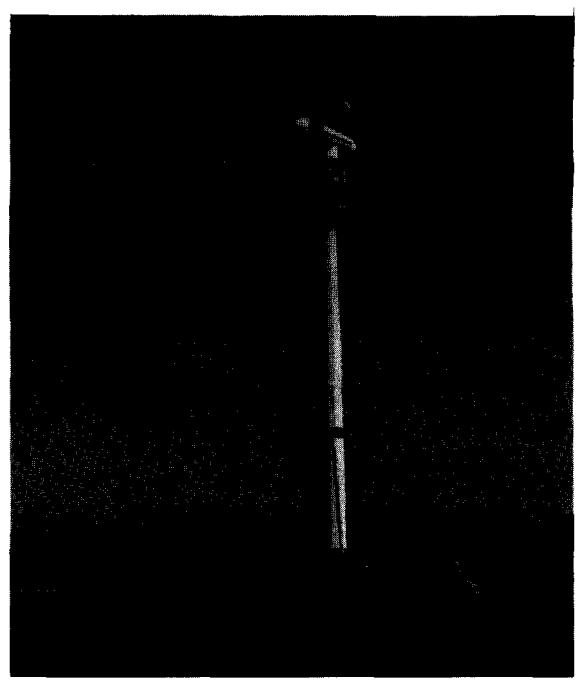
1975

Under construction in the fall of 1975, the original Mod-O wind turbine had a rigid truss tower with a central stairway (soon removed because it blocked the wind), aerospace blades and a 100-kilowatt rating.

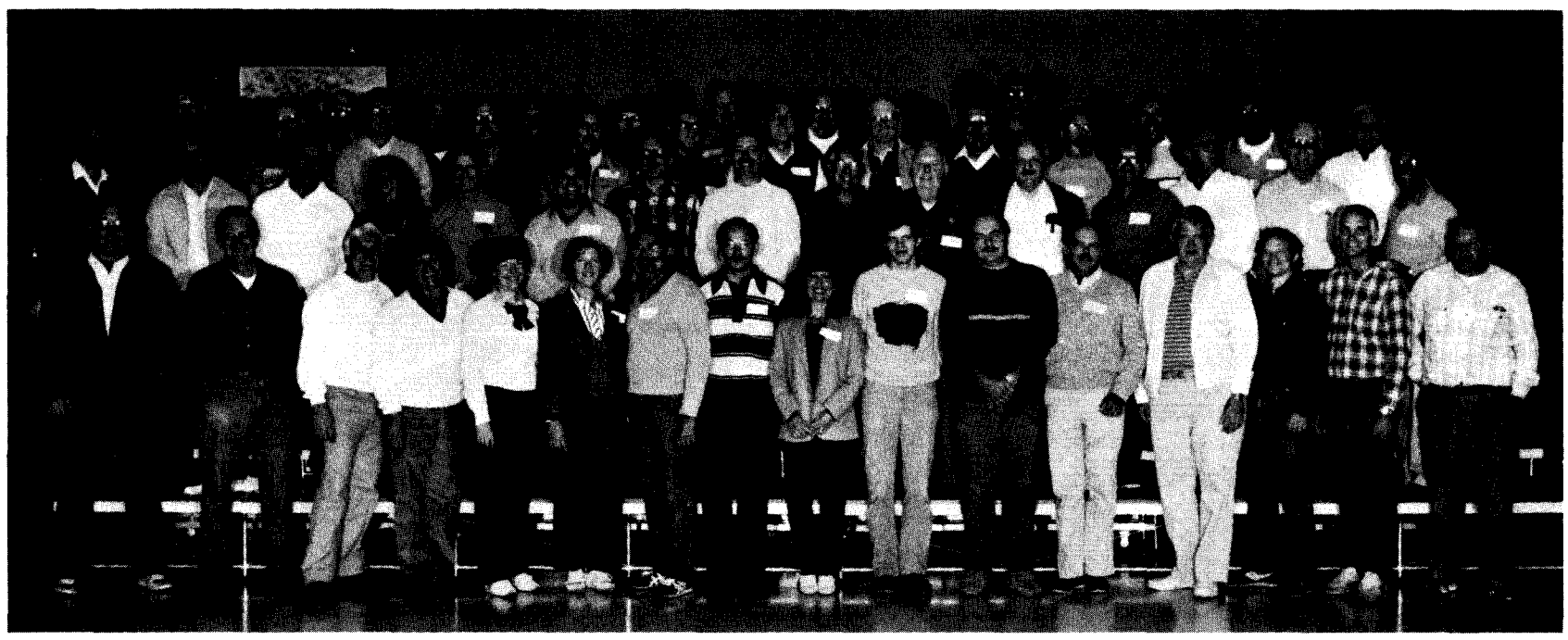
1982

Research led to major changes to reduce weight, cost and complexity. By 1982 the tower was a flexible, low-cost cylinder; blades were made from laminated wood; and aileron control surfaces eliminated the need to pitch the entire blade to control power and speed.

1985



Today the Plum Brook Turbine is testing a rotor with only one blade to reduce costs even further. Rated power has been increased to 200 kilowatts and the generator is a variable speed/constant frequency machine.



Members of the wind energy 'family' gathered at Plum Brook recently to celebrate the tenth birthday of the Mod-O turbine. Participants included Lewis and Plum Brook civil service and support service personnel (above), spouses and friends.