

NASA saves energy and water with new modular supercomputing facility

February 20 2017, by Kimberly Williams



(Artist concept, interior) The Modular Supercomputing Facility (MSF) at Ames uses fan technology that consumes less than 10% of the energy used by mechanical refrigeration in traditional supercomputing centers. Credit: NASA/Marco Librero

Though there's been some recent relief in California's long-standing drought, water conservation techniques continue to be a hot topic for facilities that require significant amounts of water for day-to-day

operations. The task of powering up and cooling down a high-end computing facility consumes large amounts of electricity and water. NASA is adopting new conservation practices with a prototype modular supercomputing facility at the agency's Ames Research Center in Silicon Valley.

The system, called Electra, is expected to save about 1,300,000 gallons of [water](#) and a million kilowatt-hours of energy each year, equal to the annual energy usage of about 90 households.

"This is a different way for NASA to do supercomputing in a cost-effective manner," said Bill Thigpen, chief of the Advanced Computing Branch at Ames' NASA Advanced Supercomputing (NAS) facility. "It makes it possible for us to be flexible and add computing resources as needed, and we can save about \$35 million dollars—about half the cost of building another big facility."

One of the benefits of the Electra system is its flexibility, through container modules that can be easily added or removed in sections without disrupting operations. NASA is already considering an expansion of up to 16 times the current capability of the modular environment to keep up with the requests for supercomputing time needed to support NASA researchers.

Scientists and engineers around the country can log into Electra to use its high-performance computing for their research supporting NASA missions. In doing so, they will significantly reduce the impact on the environment, compared to using traditional supercomputers.

"One of NASA's key science goals is to expand our knowledge of Earth systems," said Thigpen. "So we have a responsibility to do our part to lessen the impact of our technologies on the environment over the long term."

The reduced use of water and energy resources does not lessen the system's capability. The Electra system will provide users an additional 280 million hours of computing time per year, according to Thigpen. It already ranks 39th in the U.S. on the TOP500 list of the most powerful [computer](#) systems. Users of the system say it's faster and easier to run jobs in the heavily utilized NAS computing environment, where time using the agency's most powerful supercomputer, Pleiades, is always in demand.

The Modular Supercomputing Facility was built and installed by NASA partners SGI/CommScope and is managed by the NASA Advanced Supercomputing Division at Ames.

Provided by NASA

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