

cycle, the photodetector would “see” only the test body while during another designated portion of the cycle it would “see” only the reference body.

The chopper design under consideration at the time of reporting the information for this article calls for an electro-mechanical resonator comprising two permanent magnets and a reflective

prism mounted on leaf springs. Each permanent magnet would interact with one of two electromagnet coils. One electromagnet coil would be driven by amplifier to excite vibrations. The other electromagnet coil would serve as a pickup coil, providing feedback to the amplifier to set up oscillations at the mechanical resonance frequency.

*This work was done by Robert Ryan of Lockheed Martin Corp. for Stennis Space Center.*

*This invention is owned by NASA, and a patent application has been filed. Inquiries concerning nonexclusive or exclusive license for its commercial development should be addressed to the Intellectual Property Manager, Stennis Space Center; (228) 688-1929. Refer to SSC-00124.*

## The Ames Power Monitoring System

**Power demand can be managed to reduce cost.**

*Ames Research Center, Moffett Field, California*

The Ames Power Monitoring System (APMS) is a centralized system of power meters, computer hardware, and special-purpose software that collects and stores electrical power data by various facilities at Ames Research Center (ARC). This system is needed because of the large and varying nature of the overall ARC power demand, which has been observed to range from 20 to 200 MW. Large portions of peak demand can be attributed to only three wind tunnels (60, 180, and 100 MW, respectively). The APMS helps ARC avoid or minimize costly demand charges by enabling wind-tunnel operators, test engineers, and the power manager to monitor total demand for center in real time. These persons receive the information they need to manage and schedule energy-intensive research in advance and to adjust loads in real time to ensure that the overall maximum allowable demand is not exceeded.

The APMS (see figure) includes a server computer running the Windows NT operating system and can, in principle, include an unlimited number of power meters and client computers. As configured at the time of reporting the information for this article, the APMS includes more than 40 power meters monitoring all the major research facilities, plus 15 Windows-based client personal computers that display real-time and historical data to users via graphical user interfaces (GUIs). The power meters and client computers communicate with the server using Transmission Control Protocol/Internet Protocol (TCP/IP) on Ethernet networks, variously, through dedicated fiber-optic cables or through the pre-existing ARC local-area network (ARCLAN).

The APMS has enabled ARC to achieve significant savings (\$1.2 million in 2001) in the cost of power and

electric energy by helping personnel to maintain total demand below monthly allowable levels, to manage the overall power factor to avoid low power factor penalties, and to use historical system data to identify opportunities for additional energy savings. The APMS also provides power engineers and electricians with the information they need to plan modifications in advance and perform day-to-day maintenance of the ARC electric-power distribution system.

*This work was done by Leonid Osetinsky of Jacobs/Sverdrup Technology and David Wong of Ames Research Center. For further information, please contact:*

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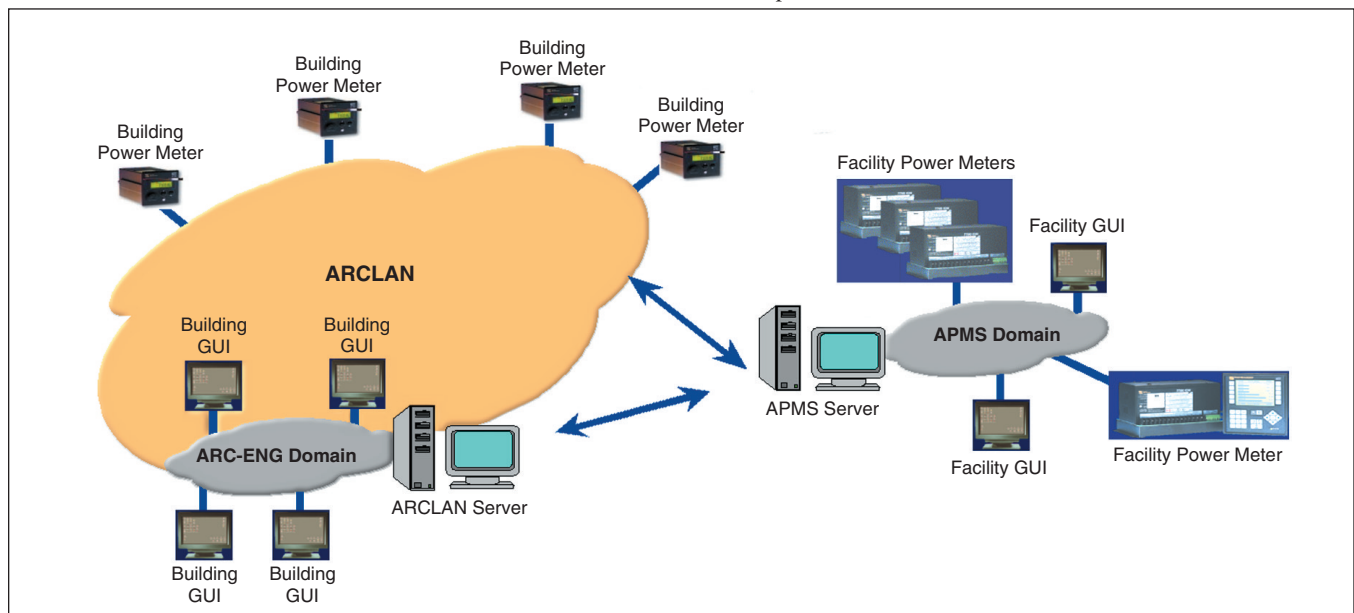
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*ARC-14909*



The APMS collects, stores, and displays data on the consumption of electric power in major subsystems of the ARC power-distribution system.