



TECHNOLOGY

Personal Robotic Air-conditioning Device

OVERVIEW

Background

Heating, ventilation, and air conditioning systems have made tremendous gains in full-load efficiency over decades of research. However, the efficiencies of many full-load HVAC systems are approaching a maximum where it will not be cost effective to improve these systems any further. In many cases, in order to reduce energy expenditure or meet utility demand requirements, users may choose to operate HVAC systems at temperature settings that are more efficient but not optimal for comfort. In colder seasons, thermal insulation and corded space heaters can provide cumbersome and temporary solutions. In warmer seasons, there are even less personalized solutions.

Innovative Technology

Researchers at the University of Maryland's Center for Environmental Energy Engineering have proposed a mobile platform to provide personalized cooling to individuals. The Robotic Personal Conditioning Device will contain a small, battery-powered, high-efficiency vapor compression heat pump, possibly with local waste heat storage, to provide localized, personal air conditioning as needed during the day while dumping stored heat and recharging batteries at night. The highly portable nature of the platform and accompanying sensor and control system will allow it to be optimally placed to improve personal comfort while reducing the energy required to cool buildings. The research team envisions a small, compact air conditioning unit that can follow the user and provide cool and/or warm air only where (and when) needed. This would increase energy efficiency by reducing the need to cool large spaces like offices and warehouses. The team is negotiating with ARPA-E for funding to further develop the technology and to develop a cost-effective product.

APPLICATIONS

Office environments with poor central air circulation or during demand management or energy saving events

Warehouses or workshops with no or limited air conditioning

Residential and healthcare facilities

ADVANTAGES

Cordless, battery powered system for high portability

Autonomous tracking for enhanced usability

Reduces load on full facility HVAC system

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Additional Information

INSTITUTION

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CATEGORIES

- Clean Tech
- Chemical
- Devices
- Industrial Processing
- Robotics

EXTERNAL RESOURCES

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