

Research Demo: Mobile Wireless Cart for UFAD Building Commissioning

**CBE
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Contributors

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Significance

- **UFAD Commissioning: Critical need for tools to support efficient & effective commissioning**
 - Commissioning buildings is key to successful implementation
 - UFAD buildings require some unique commissioning steps
- **Project specific: Client motivated to ensure system meets performance objectives**
- **Larger perspective: Cart represents step toward paradigm shift in data logging capabilities**
 - Wireless sensing
 - Real time data acquisition with simultaneous analysis

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Objectives

- **Purpose**
 - To develop a multi-function mobile cart and associated tools to support UFAD commissioning
 - Provide data to support UFAD commissioning research
- **Status/Next steps**
 - Client review and acceptance, October 25
 - Field test, October 27
 - Commence commissioning, November 15

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UFAD Commissioning toolkit

▪ Artificial loads

- Thermal plume generators to simulate occupied conditions for internal load



▪ Cart

- Mobile sensor platform supporting wireless temperature sensor network
- Laptop computer for logging, analysis, and human interface



▪ Procedures

- Functional testing procedures for UFAD systems
- Cart operating instructions



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How is cart used?

▪ Primary Functions

- Monitor stratification, plenum temperature distribution, and other data that characterize operating condition
- Display sensor data real time, archive all collected data
- Compare/analyze tests & retests
- Test interior and perimeter zones

▪ Supports pre-occupancy functional testing by commissioning agents

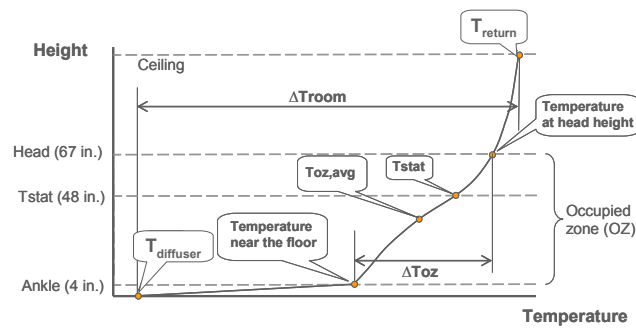
- Deploy artificial loads, heat floor below
- Monitor for steady state operation
- Conduct simultaneous plenum and room tests in given zone
- Review results relative to acceptance criteria

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Acceptance example - Stratification

- **Pass/Fail - Compare metrics to acceptance criteria**

- Average occupied zone temperature ($T_{oz,avg}$)
acceptable range, 73-75°F
- Occupied zone differential (ΔT_{oz})
acceptable range, 3-5°F



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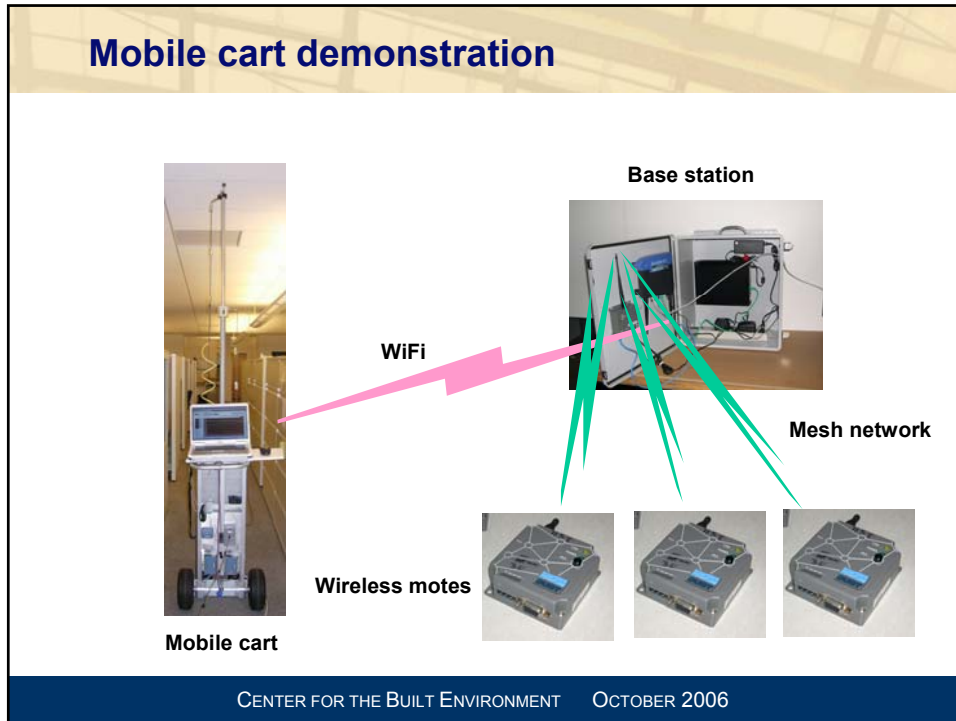
Artificial loads/thermal plume generators

- Adequately simulates average operation of typical workstation (WS) @ 250 W
- Simple setup and deployment
- Two heaters per workstation
 - Typical 4000 sf zone = 80 heaters



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Mobile cart demonstration



The diagram illustrates the mobile cart demonstration setup. On the left is a **Mobile cart** with a laptop. A pink lightning bolt labeled **WiFi** connects it to a **Base station** on the right. The base station is connected to three **Wireless motes** via a **Mesh network**, shown as green lines connecting the base station to each mote.

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Questions?

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Cart in action!

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