

BCA SkyLab

World's First High-Rise Rotatable Laboratory for the Tropics



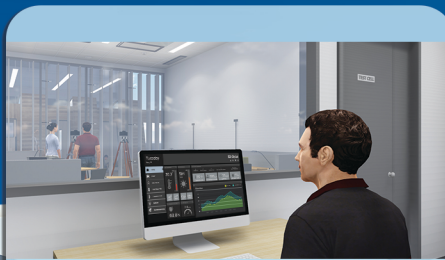
State-of-the-Art Rotatable Test Facility for the Evaluation of Energy Efficient Building Technologies
A Collaboration with Lawrence Berkeley National Laboratory

CAPABILITIES AND FEATURES



Integrated Systems Testing

- Allows efficiency in design optimisation
- Modular interior ceiling and floor system
- Flexible framing system for easy configuration of lighting, air-conditioning and facade systems
- Advanced building system controls



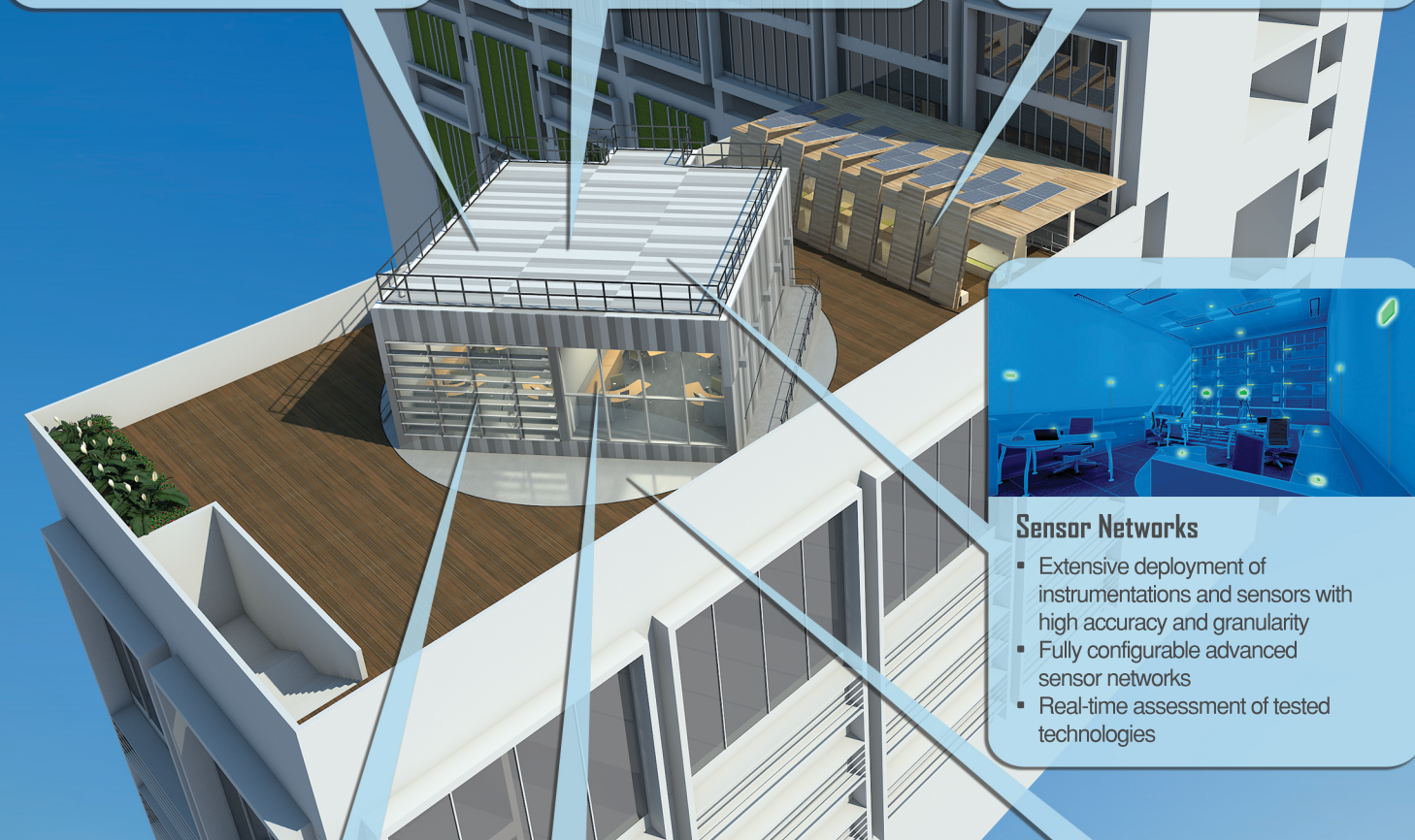
Building Management System and Data Acquisition System

- State-of-the-art BMS coupled with DAQ system
- User friendly dashboard GUI for data presentation
- Detailed calibrated energy models



Visitors' Gallery and Lounge

- Visitors' observation area
- Rooftop solar PV Panels for energy cultivation
- Interactive and informative exhibition including flyers, posters and models showcasing test-bedded projects



Sensor Networks

- Extensive deployment of instrumentations and sensors with high accuracy and granularity
- Fully configurable advanced sensor networks
- Real-time assessment of tested technologies



Test Cell

- Early detection of potential system failures or technical challenges
- Accurate assessment of technologies' potential
- Capable of emulating actual occupancy in an office setting
- System that can be tested include:
 - Facade and sun shades
 - Daylighting and lighting
 - ACMV and cooling systems



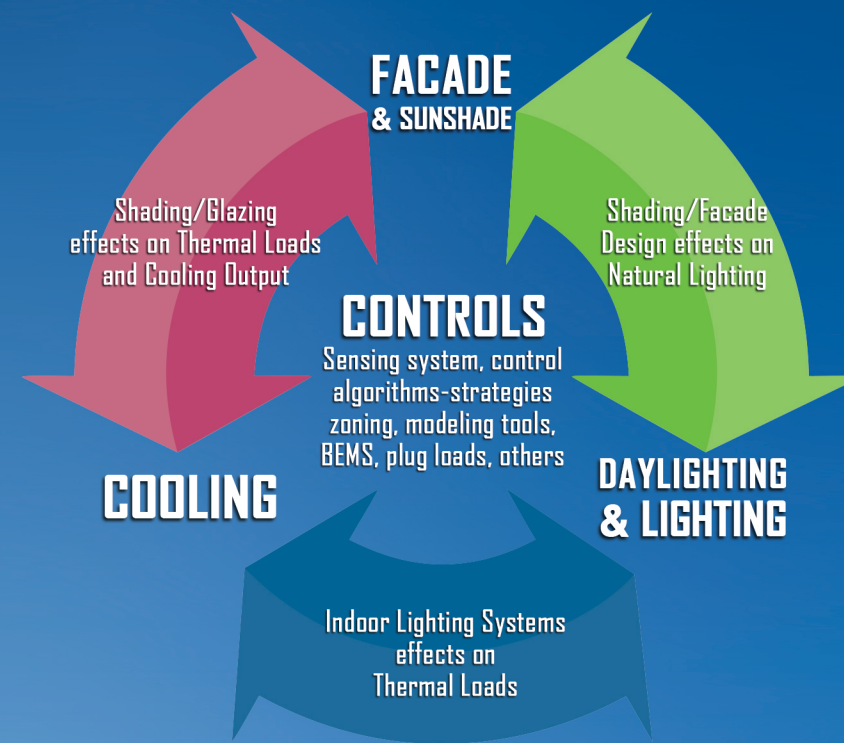
Reference Cell

- Fully configurable real world office interiors
- Reference standards for the Test Cell



Rotatable Platform

- Rotatable up to 360 degrees
- Generally not shaded by surroundings
- Flexible tests in varying orientations



The BCA SkyLab is able to test the energy performances of facade, cooling and lighting.

The BCA SkyLab offers researchers and industry players with:

Comprehensive Plug and Play Testing Capabilities

- Capability to test technologies and systems individually or in combined configurations
- Two adjacent cells for comparative and benchmark analysis

Rotatable Outdoor Facility in Real-World Condition

- Capability to test at any orientation relative to the sun or wind
- High-rise, real-world building setting

Platform for Knowledge Sharing and Sample Demonstration

- Dedicated lounge and sample demonstration space

INFRASTRUCTURE

Physical Setup

- Two test cells at 40m² each with 3.6m ceiling height
- Complete outdoor setting
- Rotatable platform
- Fully reconfigurable facade and M&E system
- Real office environment
- Integrated control room

Technical Features

Building Envelope

- Glazing and opaque assemblies
- Exterior/Interior shading devices
- Adiabatic walls and roof

ACMV

- Reconfigurable A/C systems with built-in fan coil units (e.g. Variable air volume, radiant panels, chilled beam, displacement ventilation, UFAD)
- Thermally isolated radiant topping slab

Lighting

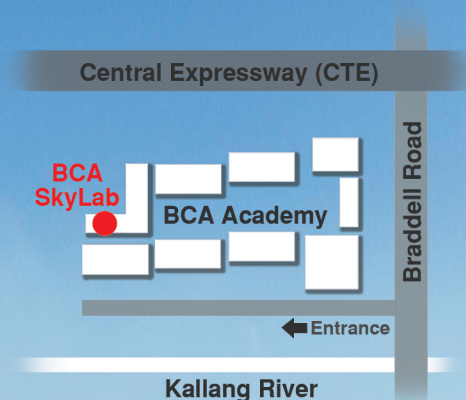
- Reconfigurable lighting features with built-in LED
- Lighting controls (e.g. dimmable ballast, addressable control device)

Data Acquisition (DAQ) and Control System

- Local DAQ server for both test and reference cells
- Secure database per cell
- LabView and SCADA based controls with custom sequence scripting tool
 - Base ACMV controls
 - Control sequences for other systems (e.g. lights, shades)
- Full monitoring and data visualization capabilities
- User interface for simulation and scripting language platforms

Instrumentation

- Power metering
 - A/C, lighting
 - Whole facility as well as individual plug load
- High accuracy thermal measurement
 - Heat flux through building facade
 - Chilled water flow meters and temperature sensors at each cell
- Other high accuracy instrumentation
 - CO₂ sensors
 - Occupancy sensors
 - Air supply flow measurements
 - Lighting and glare measurements
 - Calibration capabilities
 - Weather station



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