

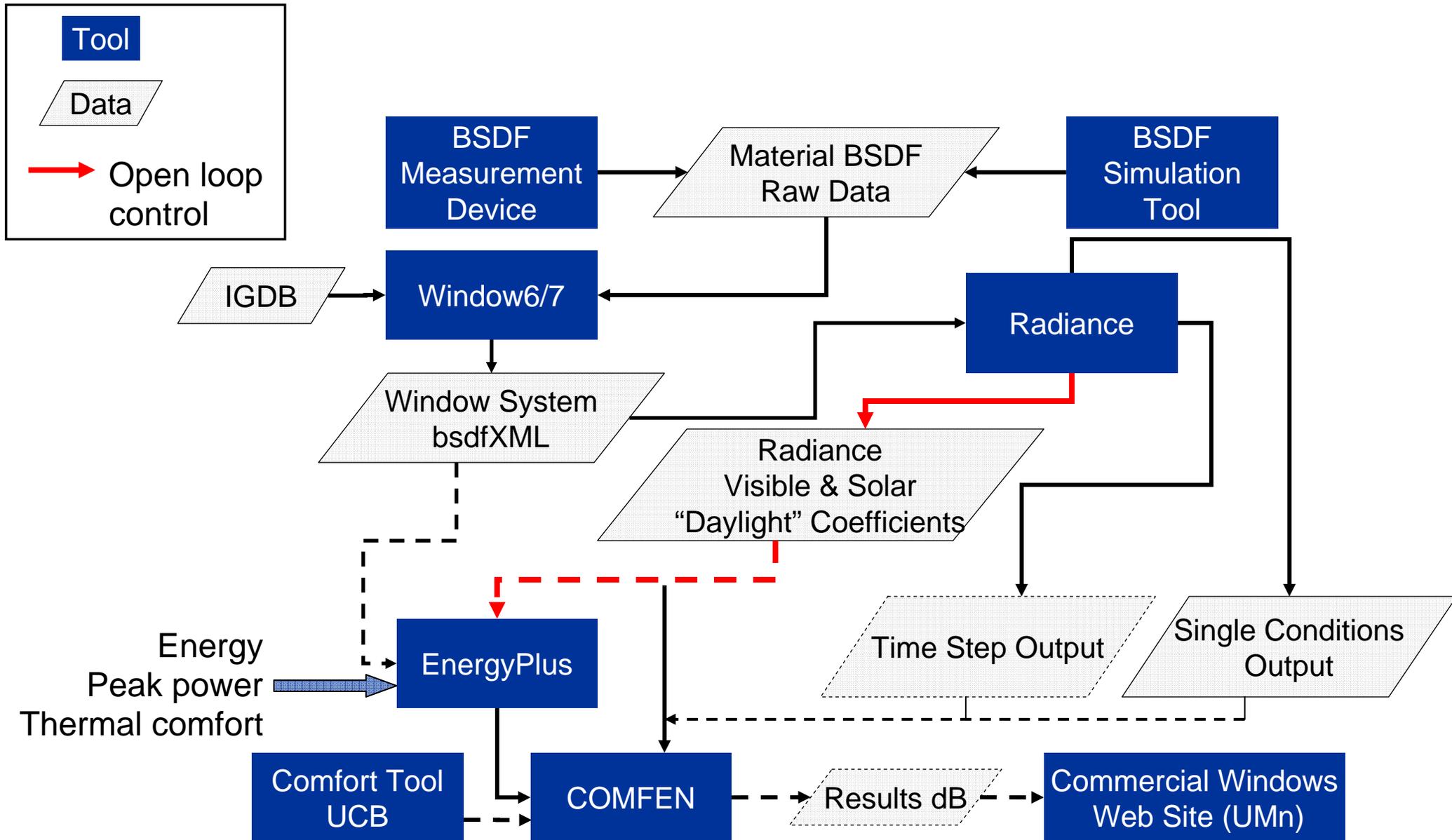
Simulation Tools

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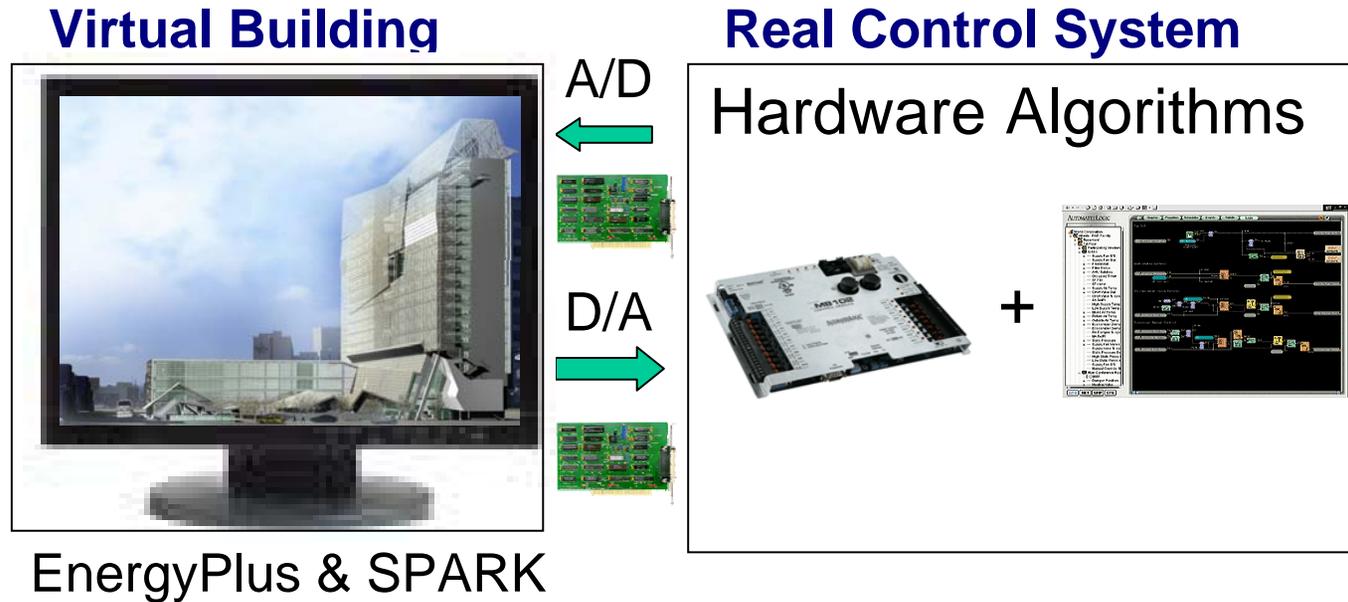
- Performance Assessment Tools
- Virtual Building Controls Test Bed
 - Application
 - Current development and possible extensions



Performance Assessment Tools



Current BCVTB: E+ to BACnet



- Simulation provides **quantitative link** between design and operations
- **Savings** include \$1.5M for simpler façade
- **Pre-commissioning** of the controls before installation allowed programming problems to be identified and fixed before occupancy

Ongoing R&D for BCVTB

Goal

Modular integration of tools for **system performance assessment**

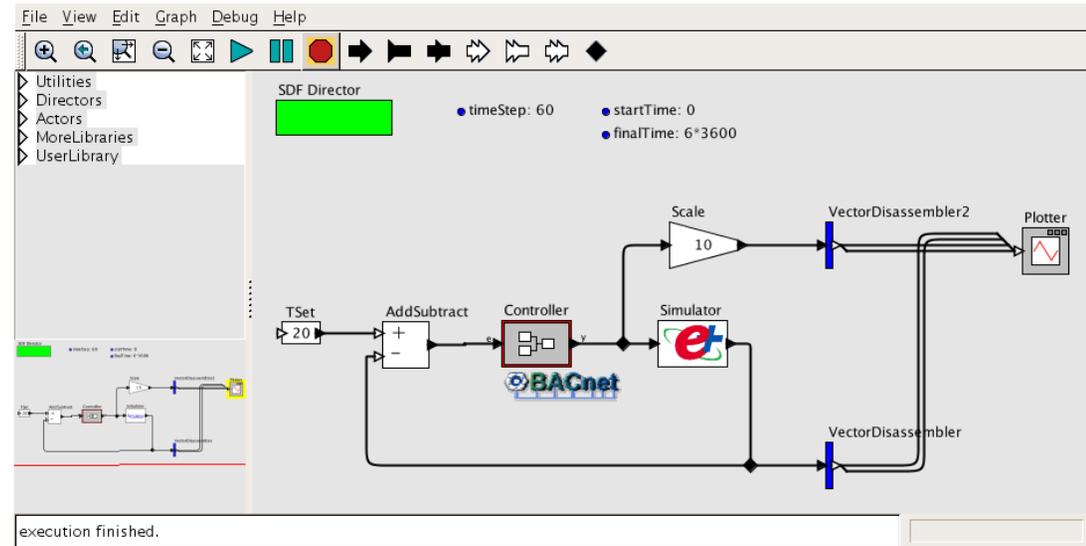
- R&D
- design
- operation

Ongoing R&D

Develop **platform** that integrates simulation tools for design and operation of multi-disciplinary building systems.

Current project focus: thermal comfort, energy and peak power.

Modular building controls virtual test bed



<https://gaia.lbl.gov/bcvtb>

Possible extension to support Lighting Controls Test Bed

Link

- Radiance
- lighting control systems
- EnergyPlus

Typical applications:

- model based **concept evaluation** prior to hardware testing
- closed loop control of **visual comfort, thermal comfort, energy and peak power**
- **optimization-based** control

