Fast Hybrid Test Platform for Seismic Performance Evaluation of Structural Systems

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Hybrid

Combine physical testing with model-based simulation.

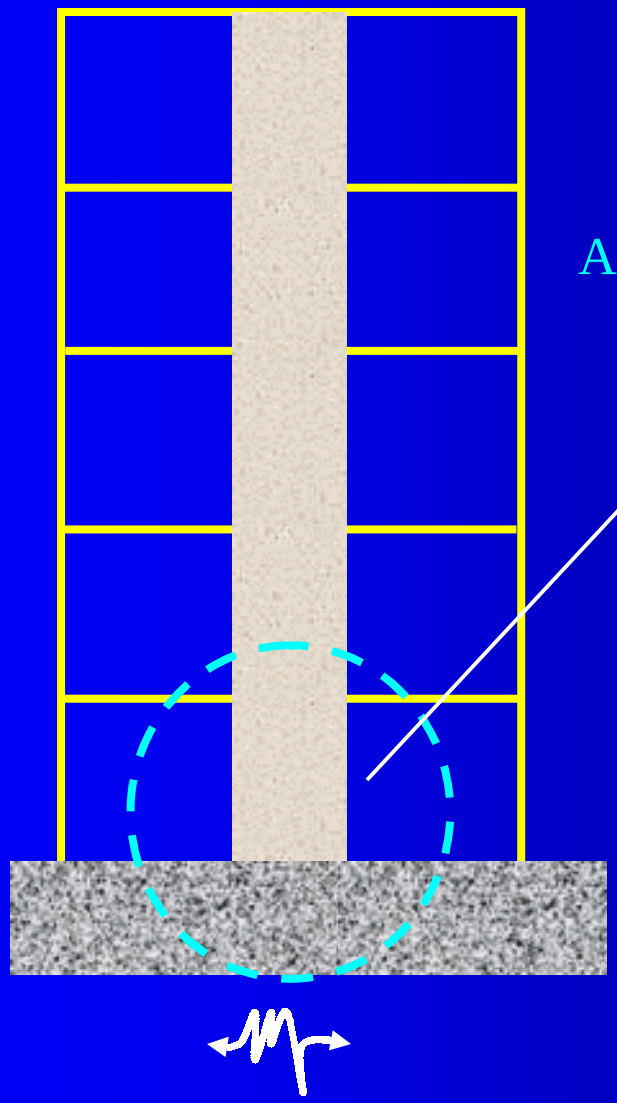
Fast

Rate of loading in the range of 10 to 100% of real time.

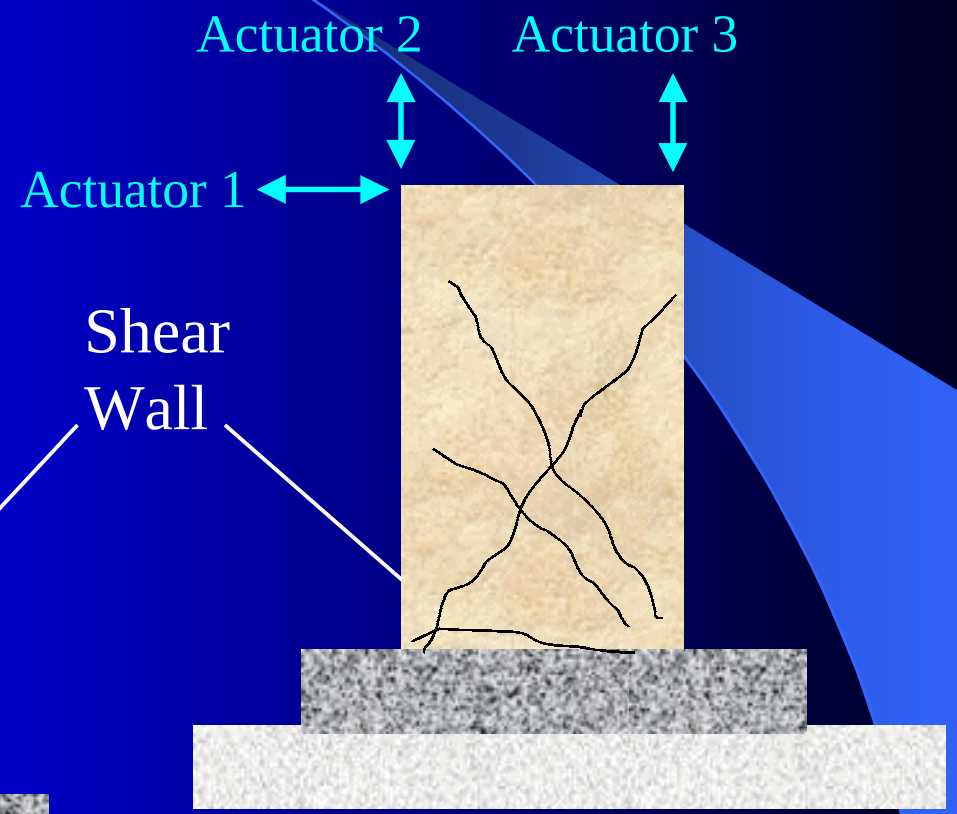
Actuators in continuous motion.

Application

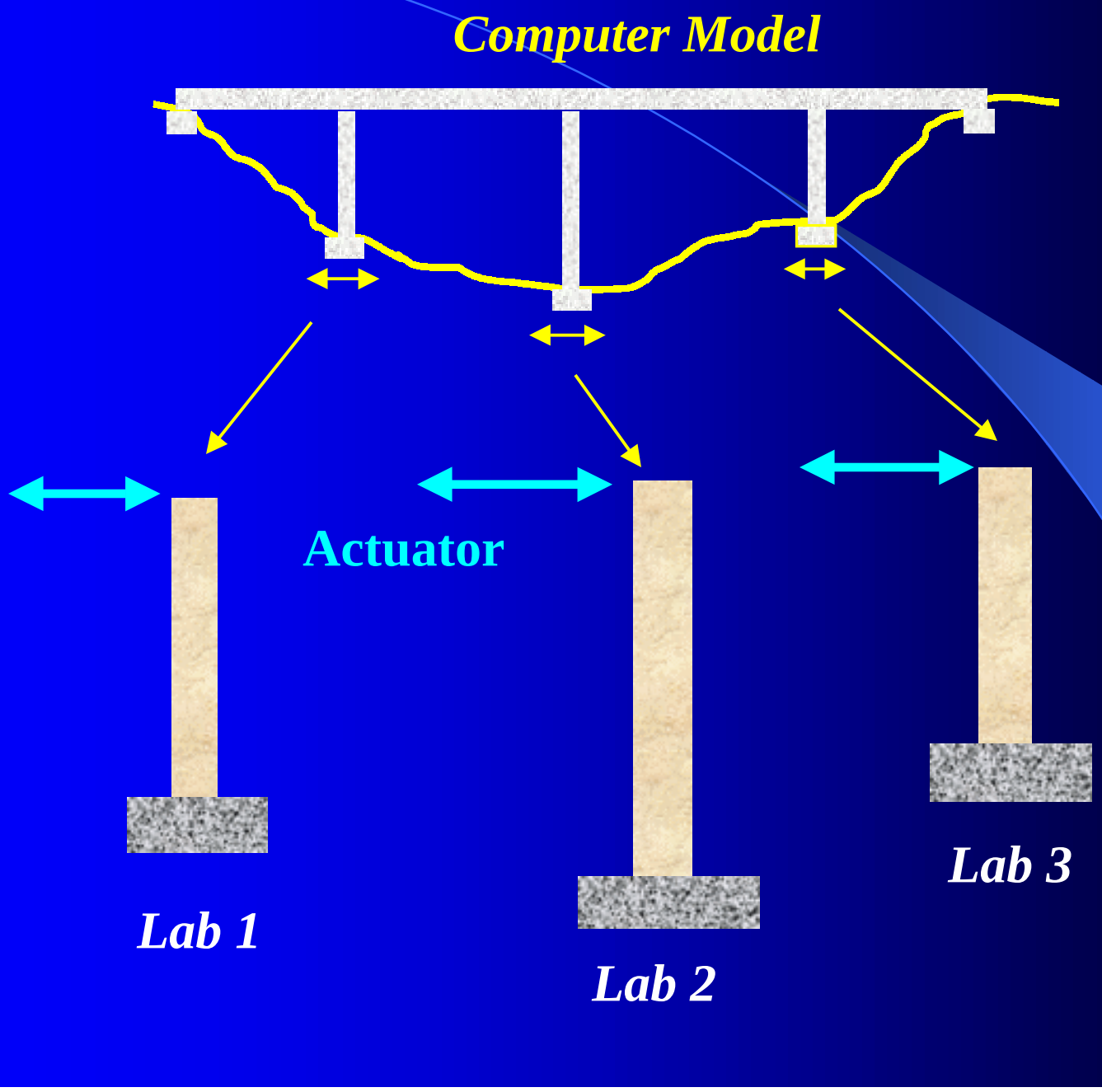
Computer Model



Test Specimen

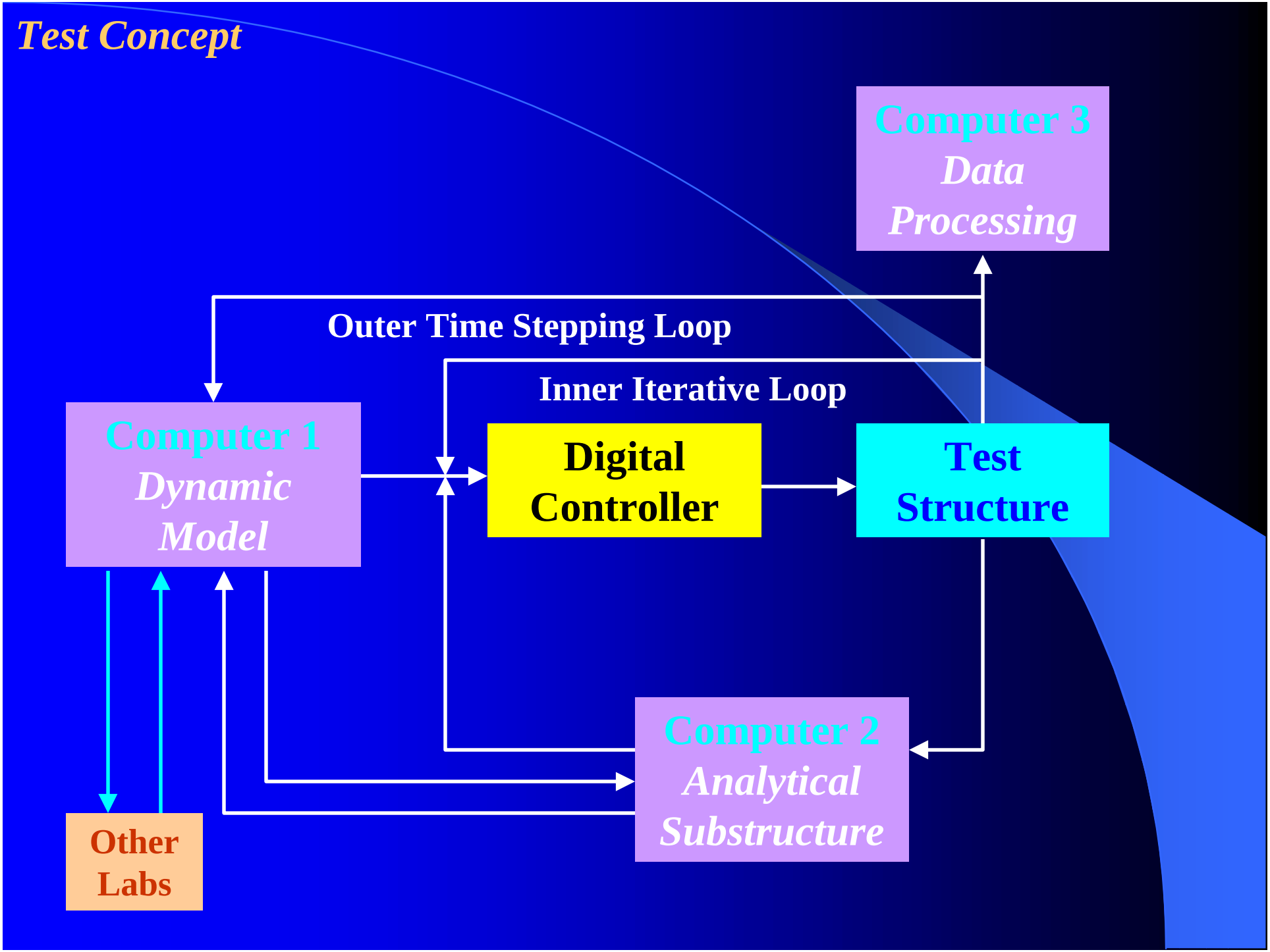


Application



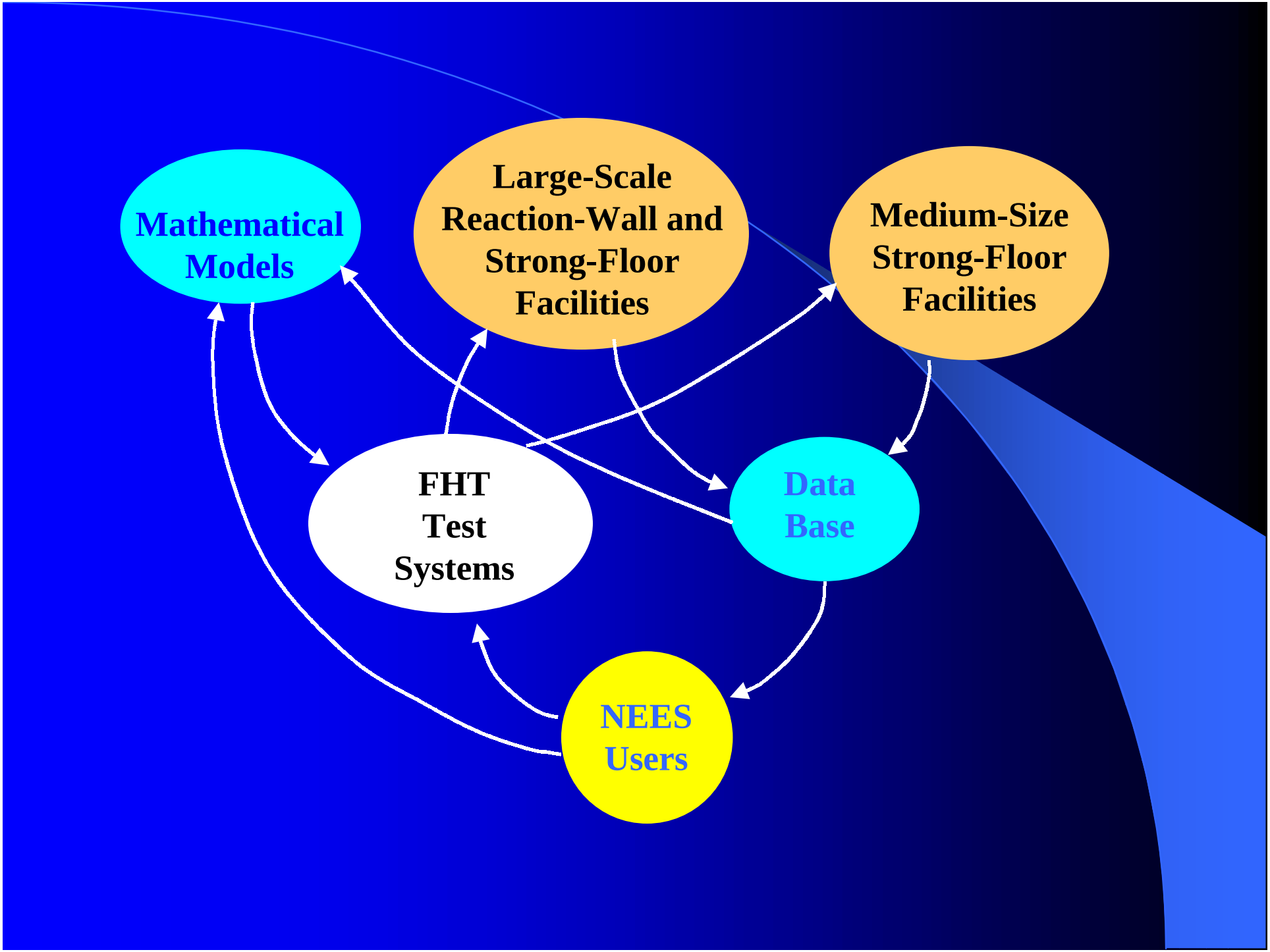
Major Equipment

- **A three-channel digital controller with displacement, velocity, and acceleration control.**
- **One 220-kip, ±5-in. stroke actuator with 250-gpm servo-valve.**
- **Upgrade of two existing 110-kip, ±5-in. stroke actuators with 250-gpm servo-valves.**


Test Concept
Computer 3
Data
Processing
Outer Time Stepping Loop
Inner Iterative Loop
Computer 1
Dynamic
Model
Digital
Controller
Test
Structure
Computer 2
Analytical
Substructure
Other
Labs

Challenges

- **Control of structural displacements in a continuous, fast and precise manner.**
- **An efficient and robust computation scheme with nonlinear substructures.**
- **Innovative software and state-of-the-art hardware to integrate numerical computation with digital control.**


Mathematical Models
Large-Scale Reaction-Wall and Strong-Floor Facilities
Medium-Size Strong-Floor Facilities
FHT Test Systems
Data Base
NEES Users