University of Minnesota
NSF George E. Brown, Jr NEES Site

Multiaxial Subassemblage Testing (MAST) System

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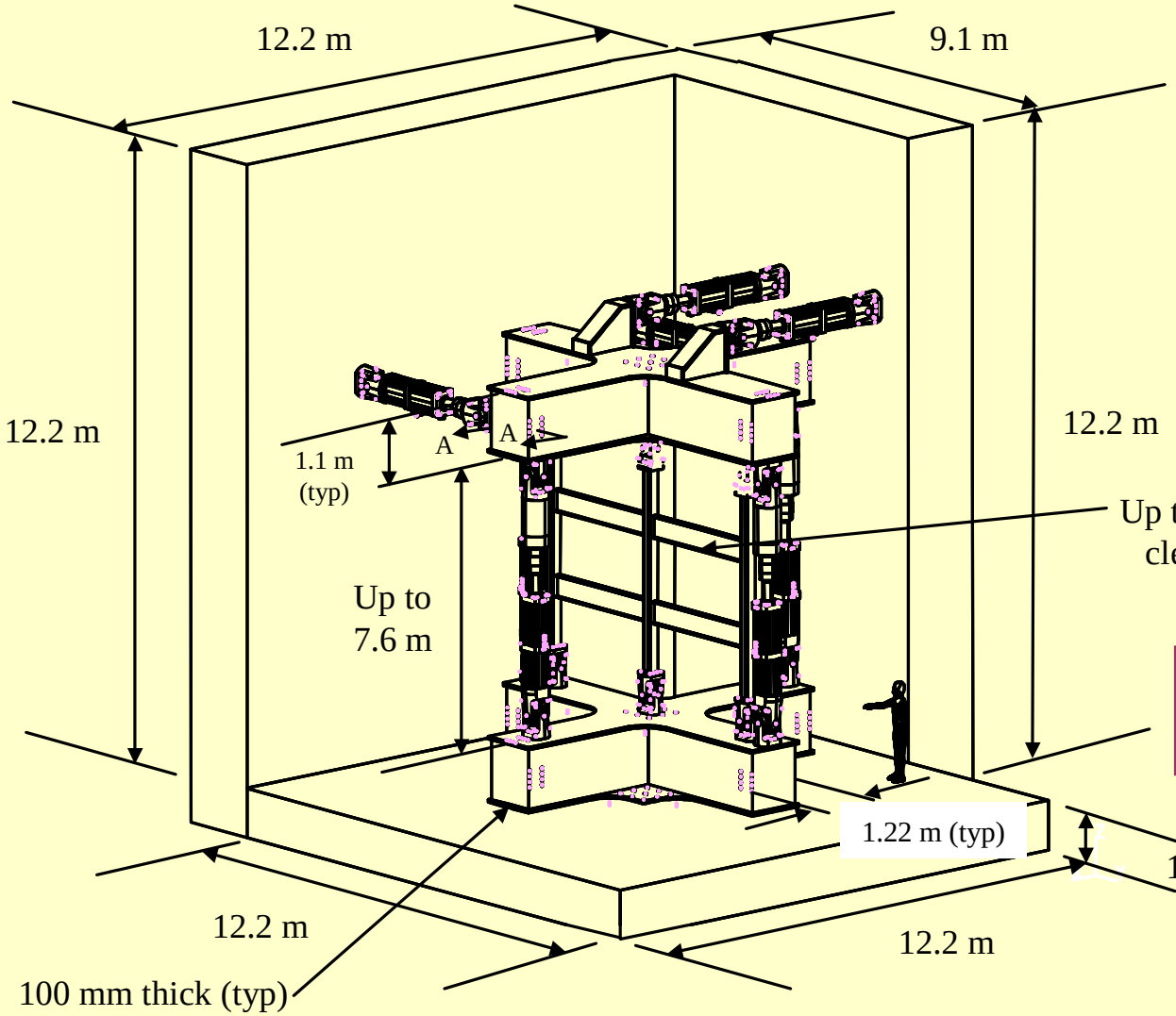
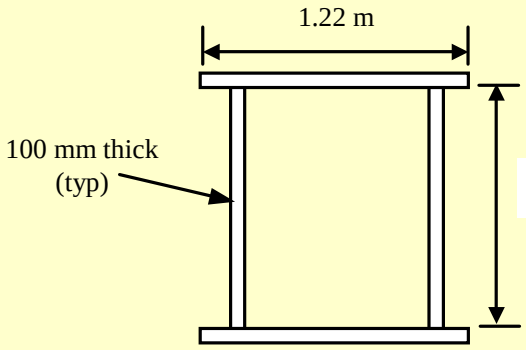
Multiaxial Subassemblage Testing System (MAST)



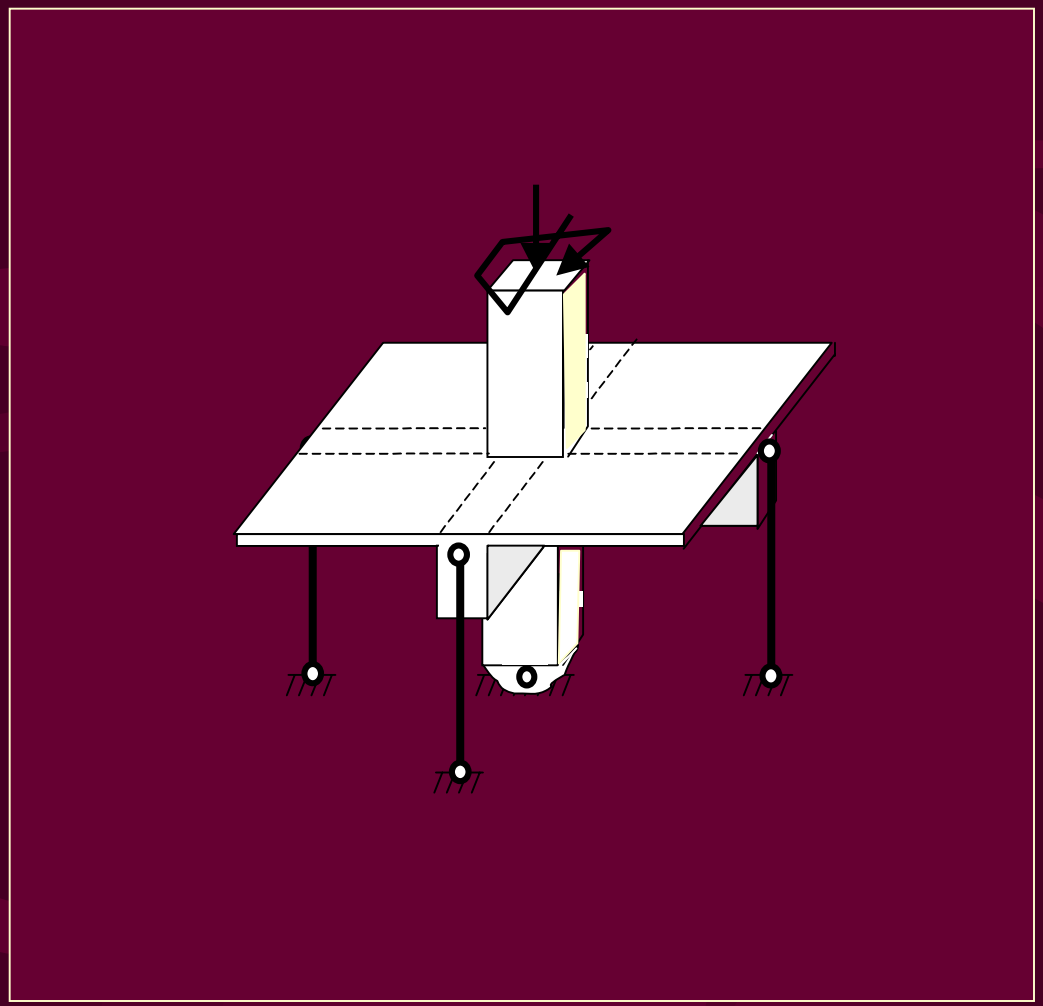


Section A-A:
crosshead cross
section (typ.)

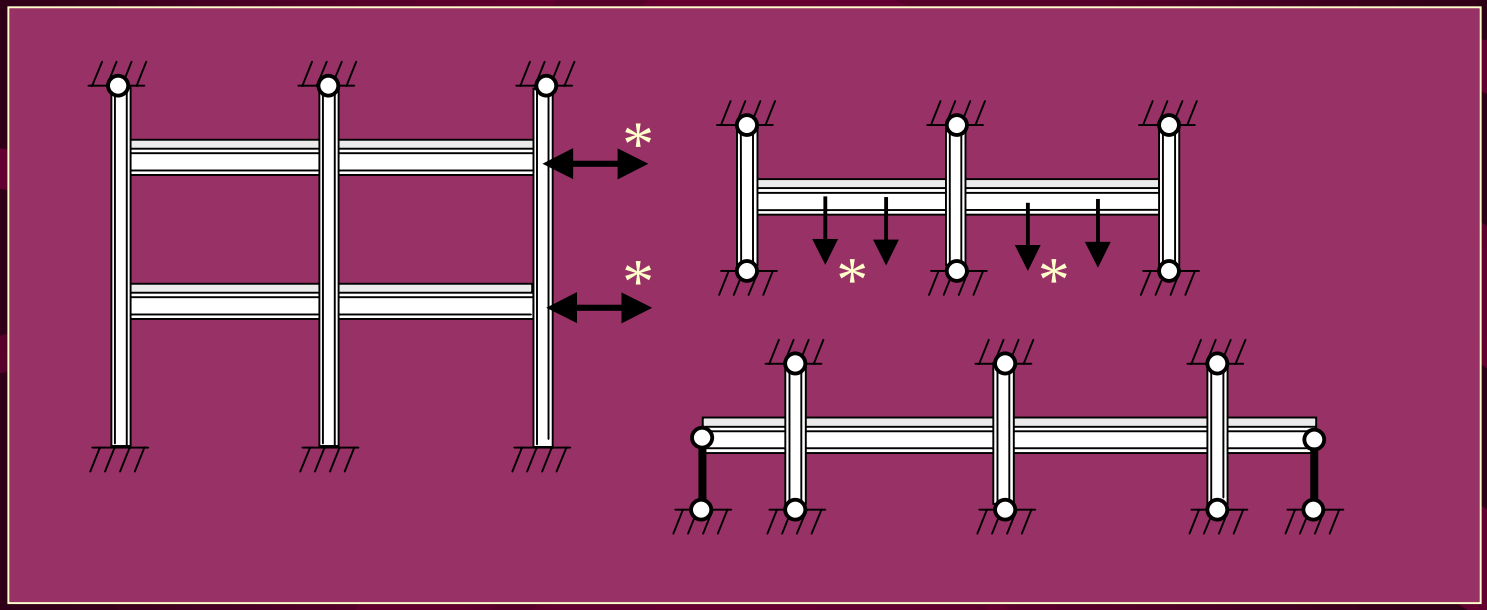
6-DOF Control

Not to scale

Beam-Column Joint Subassemblage

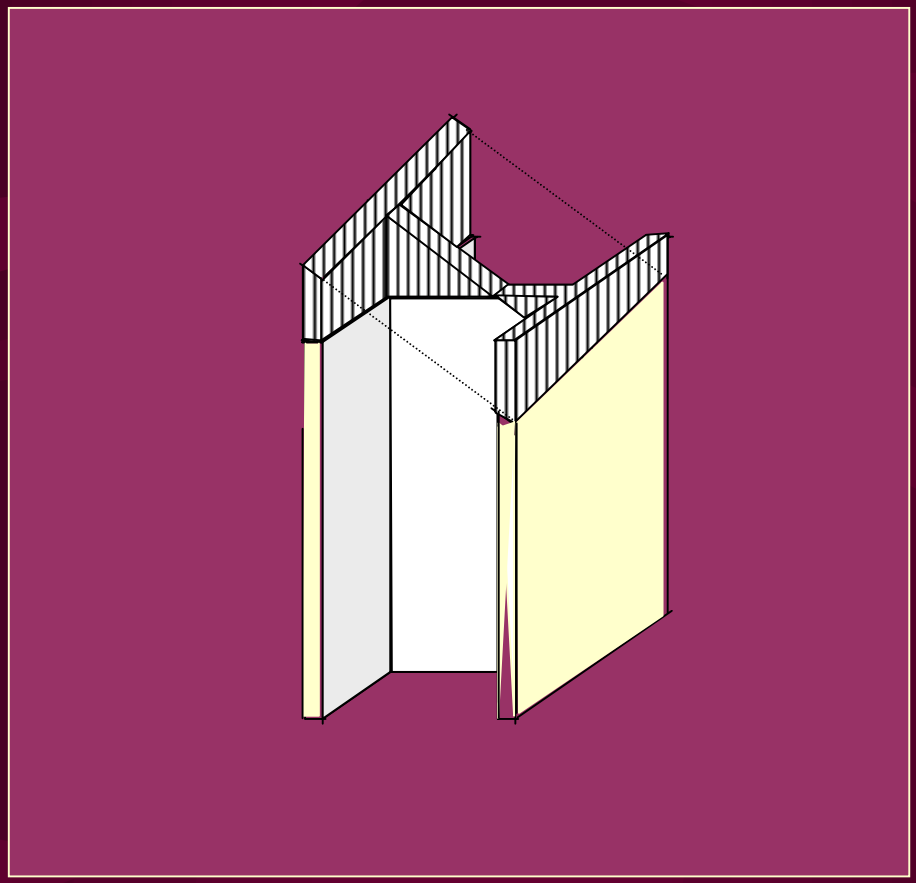


Frame Subassemblage



*Illustrates potential applications for ancillary actuators

Wall Subassemblage

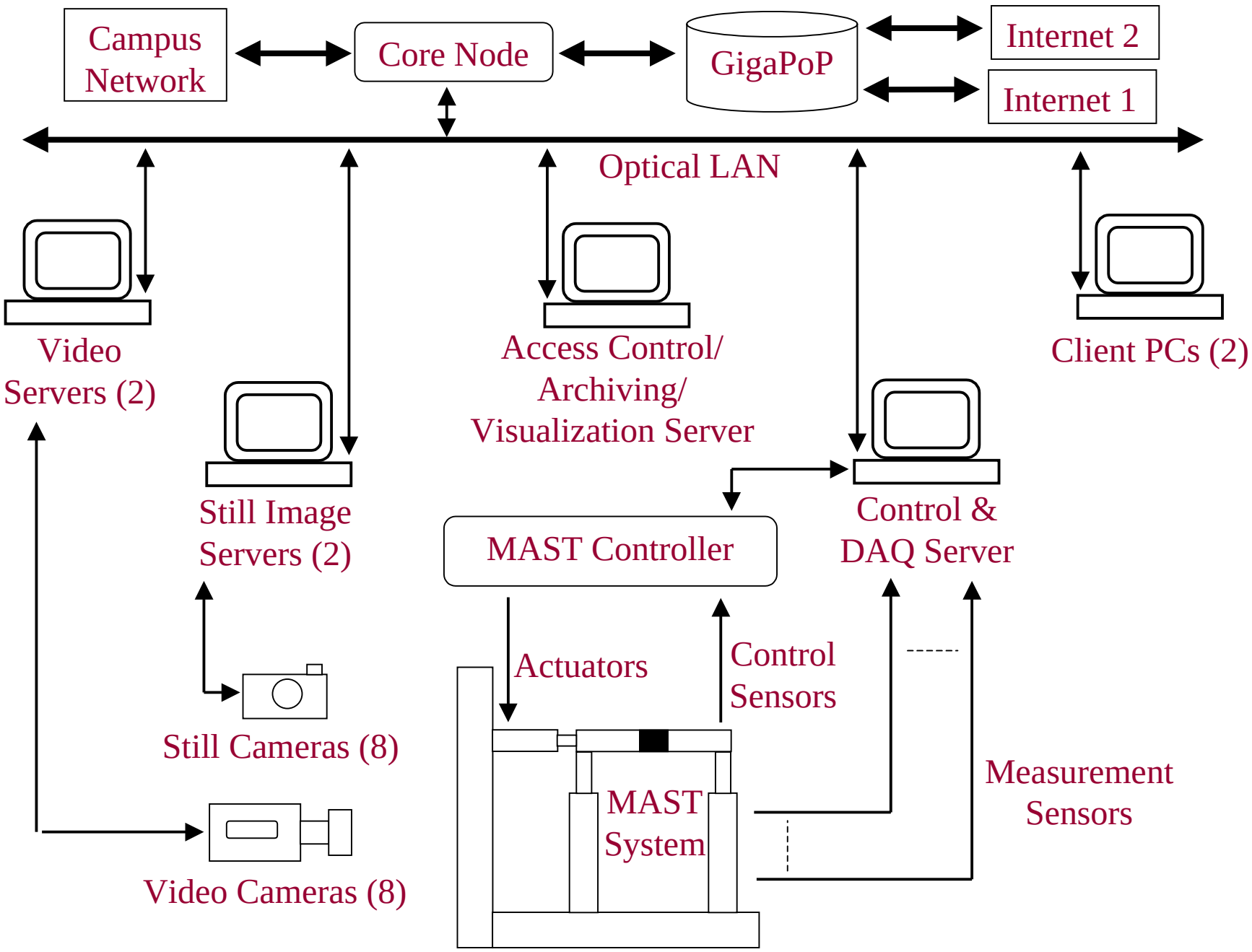


Anticipated Specimen Load and Stroke Demands

Specimen Type	Dimensions		Longitudinal		Lateral		Axial	Ancillary	
	Column (in)	Beam (in)	Load (k)	Stroke (in)	Load (k)	Stroke (in)	Load (k)	Load (k)	Stroke (in)
EX. #1 Scale 1:1	40x42	18x40	±340	±13	±340	±13	1200	±220	±8
EX. #2 Scale 1:2	W8x67 F_y=50ksi	W16x31	±150	±15	optional		1000	optional	
EX. #3 Scale 3:4	15x15ft. in plan 9" thick[1]		±650 // to web		±150 ⊥ to web		900	optional	
MAST Capacity	20x20 ft. in plan vertical 25 ft. (var.)		±880	±16	±880	±16	1320 +/- 20"	±220	±16

[1]Flanged wall dimensions 15x15ft. in plan, 9 in. thick, with longitudinal loading parallel to the web, and lateral loading normal to the web.

MAST System Teleparticipation Infrastructure

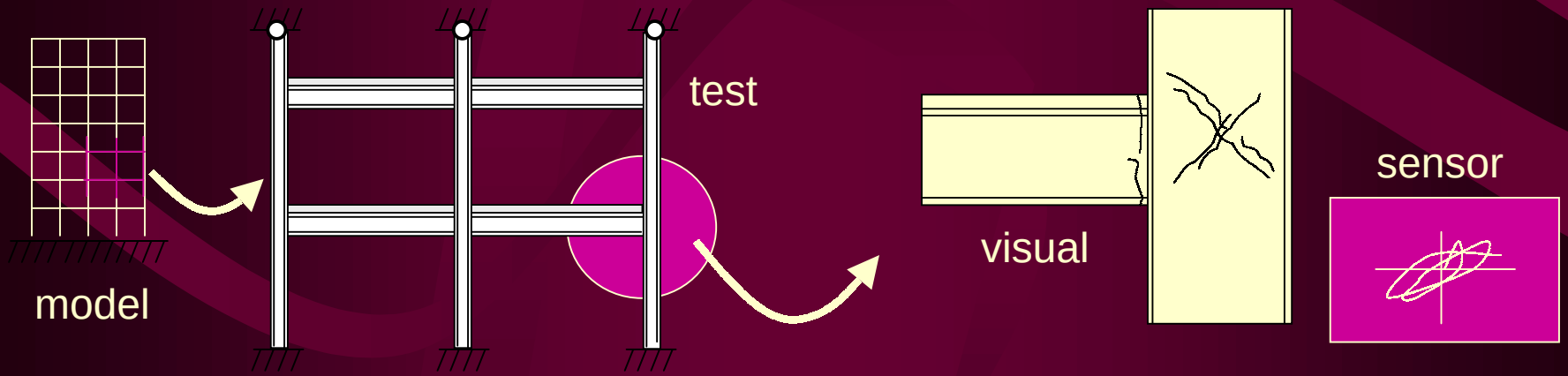


One Expectation for System Integration…

Common framework for Control, Archiving, Replay

Example for structural tests--geometric framework

- graphically associate dimensions, instrument locations, (metadata file) with structure
- use as framework for analytical model or simulation
- “click on framework” to guide control of teleobservation equipment, to display sensor data, etc.



Common Issues:

- Ordering equipment (hydraulic, telepresence, sensors)
- Design/detailing of facility (strong walls, control room)
- Sharing knowledge/experience (e.g. Effective Force Testing (EFT), real-time tests of large-scale structures w/ force control)
- All issues related to system integration
  - common data structure, geometric framework, security, specifications for telepresence, pseudo-dynamic software, timeline
- All issues related to consortium
  - user fees
  - integrated testing and scheduling
  - degree of local control (over scheduling, over tests)
- Setup and composition of advisory committee