UNIVERSITY AT BUFFALO
State University of New York
SCHOOL OF ENGINEERING
AND APPLIED SCIENCES

Department of Civil, Structural, and Environmental Engineering

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TELEPARTICIPATION IN NEES COLLABORATORY

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* Presenting Author

Concept of Tele-Participation

- **Experimentation**
  - **Preparation of Experiments**
  - **Calibration of instruments and experiments**
  - **Activation and control of experiments**
- **Observation**
  - **Selection and manipulation of data**
  - **Manipulation of instruments and sensors**
  - **Processing of instruments data**
- **Simulation and feedback**
  - **Development of pre-testing model**
  - **Manipulation of models during testing**
  - **Identification of model parameters and simulations**

Outline

- NEES / Node operations
- Teleparticipation concept
- Examples of low level teleparticipation
- Examples of high level teleparticipation (live)
- Equipment chart

Experimental Research

- **"Analysis → Testing → Analysis → Testing → Analysis → … an endless cycle"**

  V.V.Bertero

- **Final product is a computational model for engineering decisions**

Real-Time Seismic Hybrid Testing

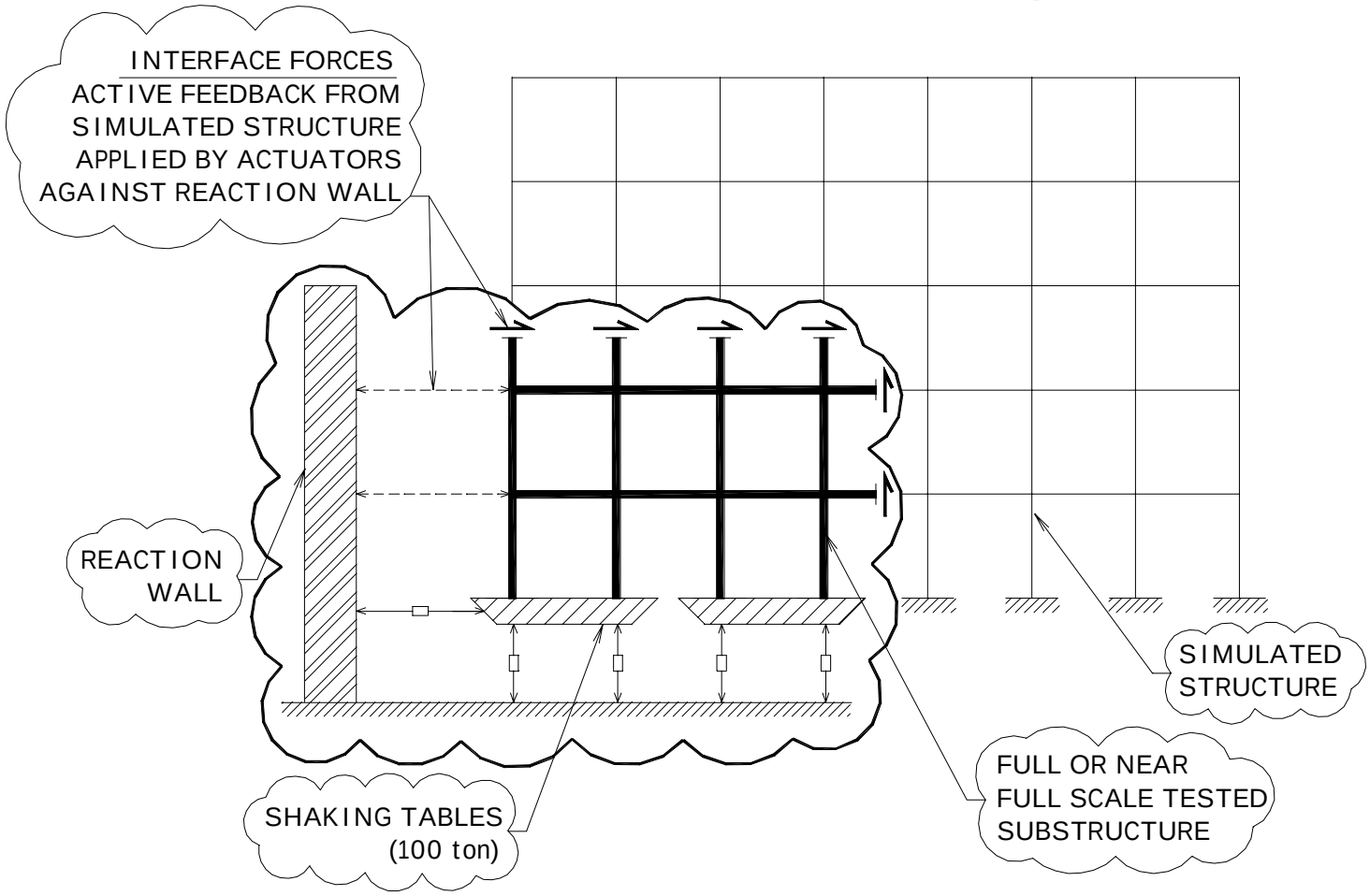
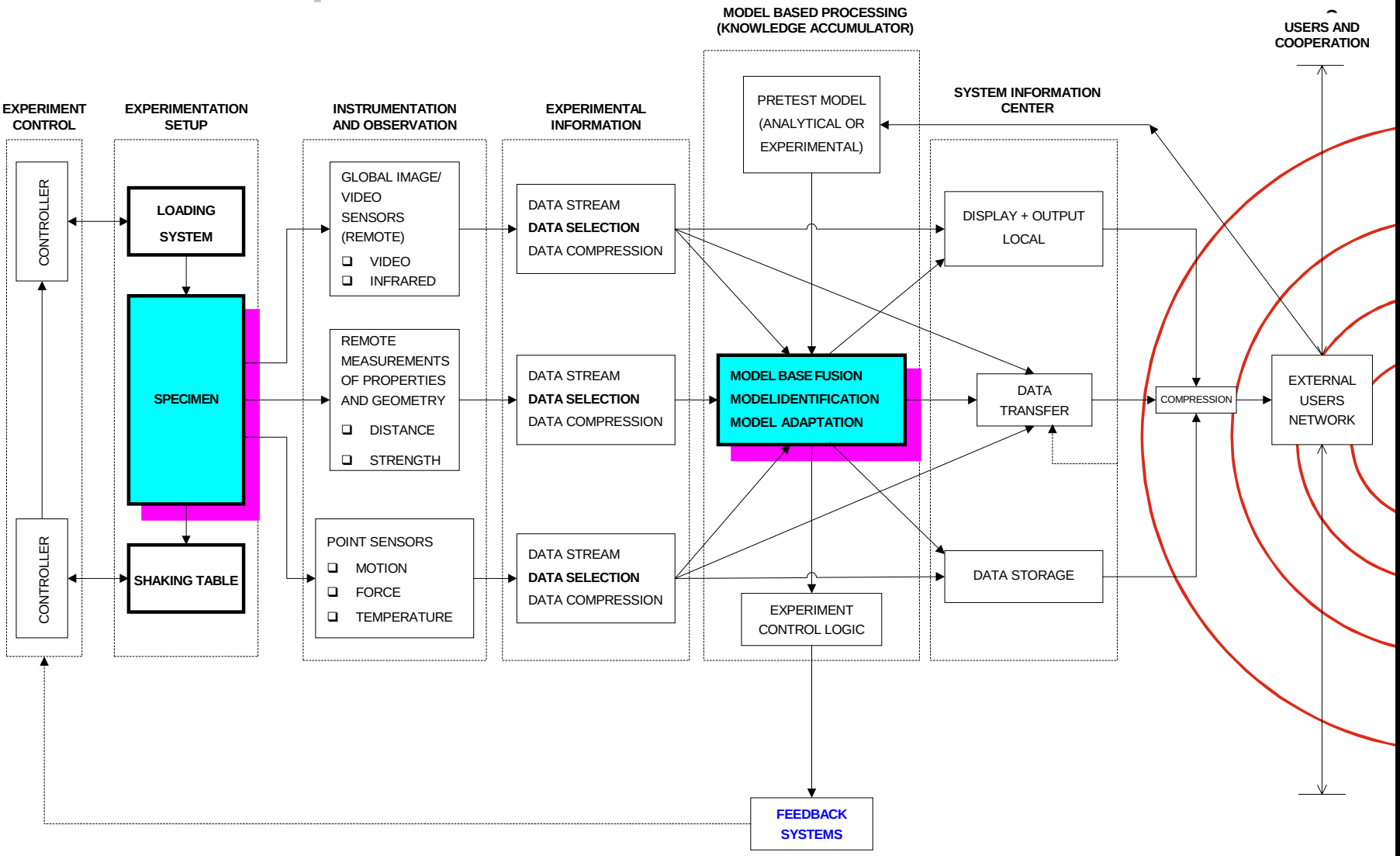
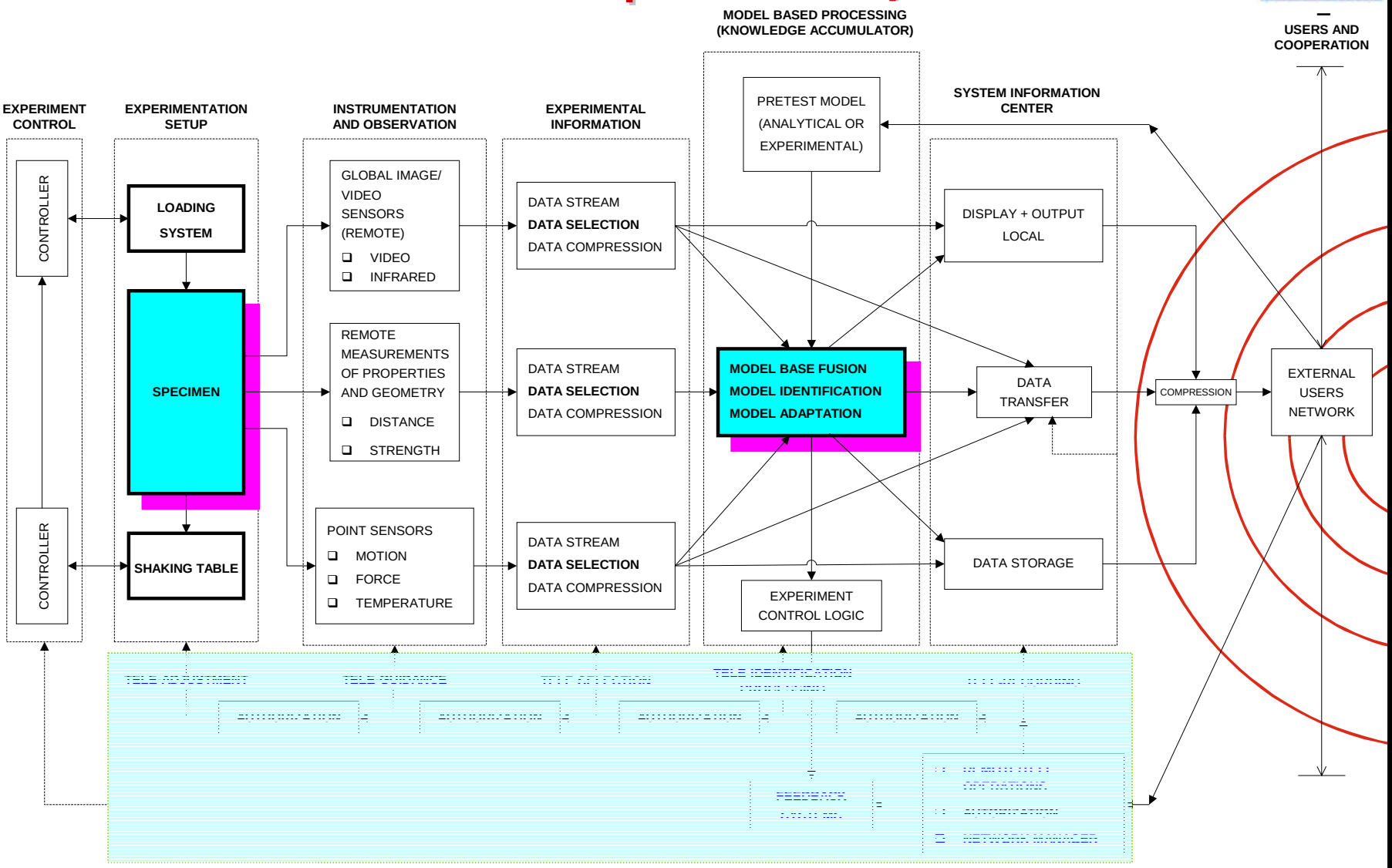


Fig.1. Real-Time Hybrid Seismic Testing System (Substructure Dynamic Testing)

Node Operations



Node with Teleparticipation



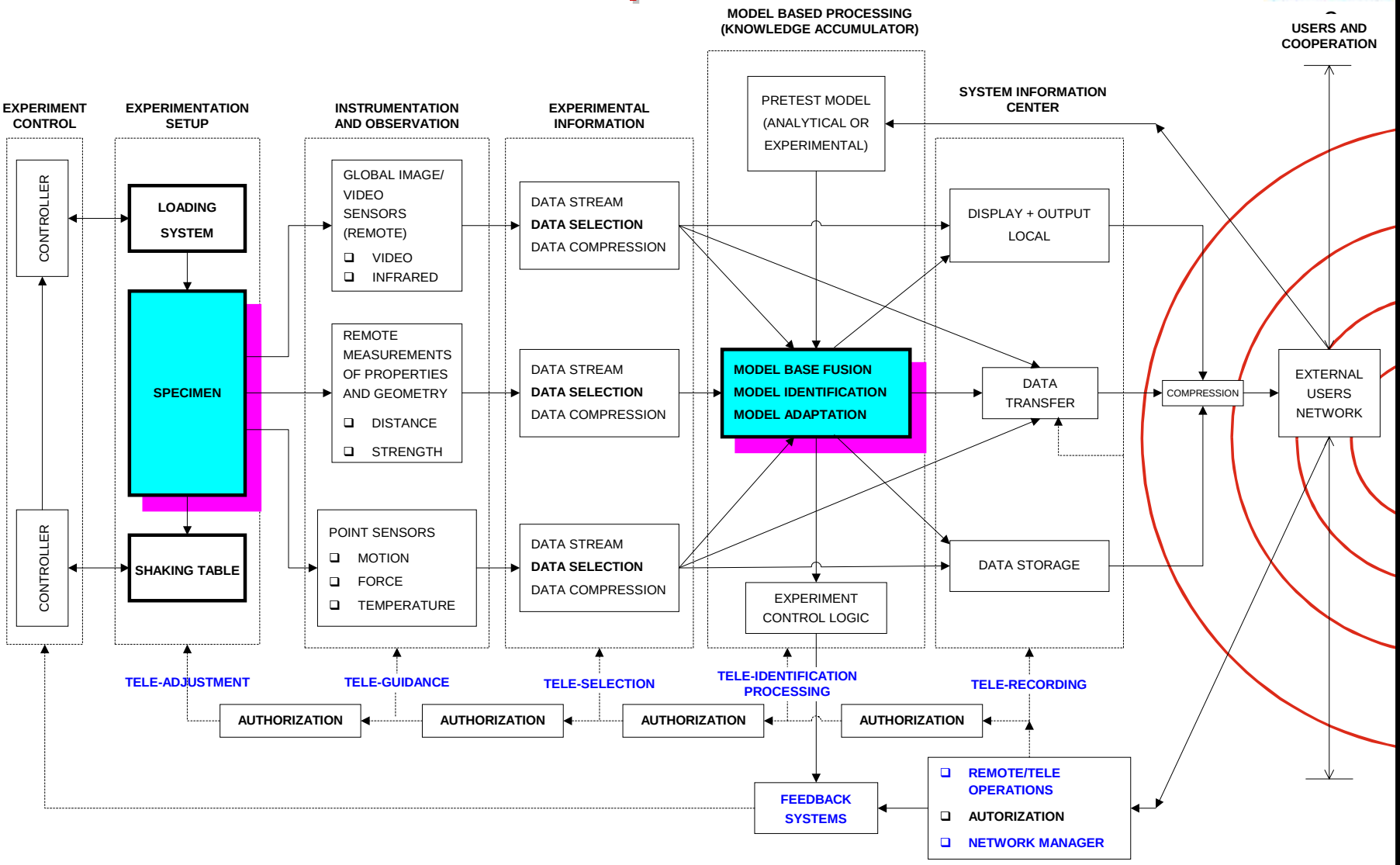
Tele-participation

Teleparticipation components

- Experiment **tele-control**
- Experiment **tele-adjustment** (input, etc)
- **Tele-guidance** of instruments and equipment
- **Tele-selection** of data channels and information
- **Tele-processing** of data and knowledge accumulation
- **Tele-recording** and transfer of data and models
- **Tele-planning** of experiments

The above are hierarchical activities depending of node scope and operations

Node with Teleparticipation



Examples of low level tele-participation

Teleparticipation components

- Experiment **tele-control**
- Experiment **tele-adjustment** (input, etc)
- **Tele-guidance** of instruments and equipment
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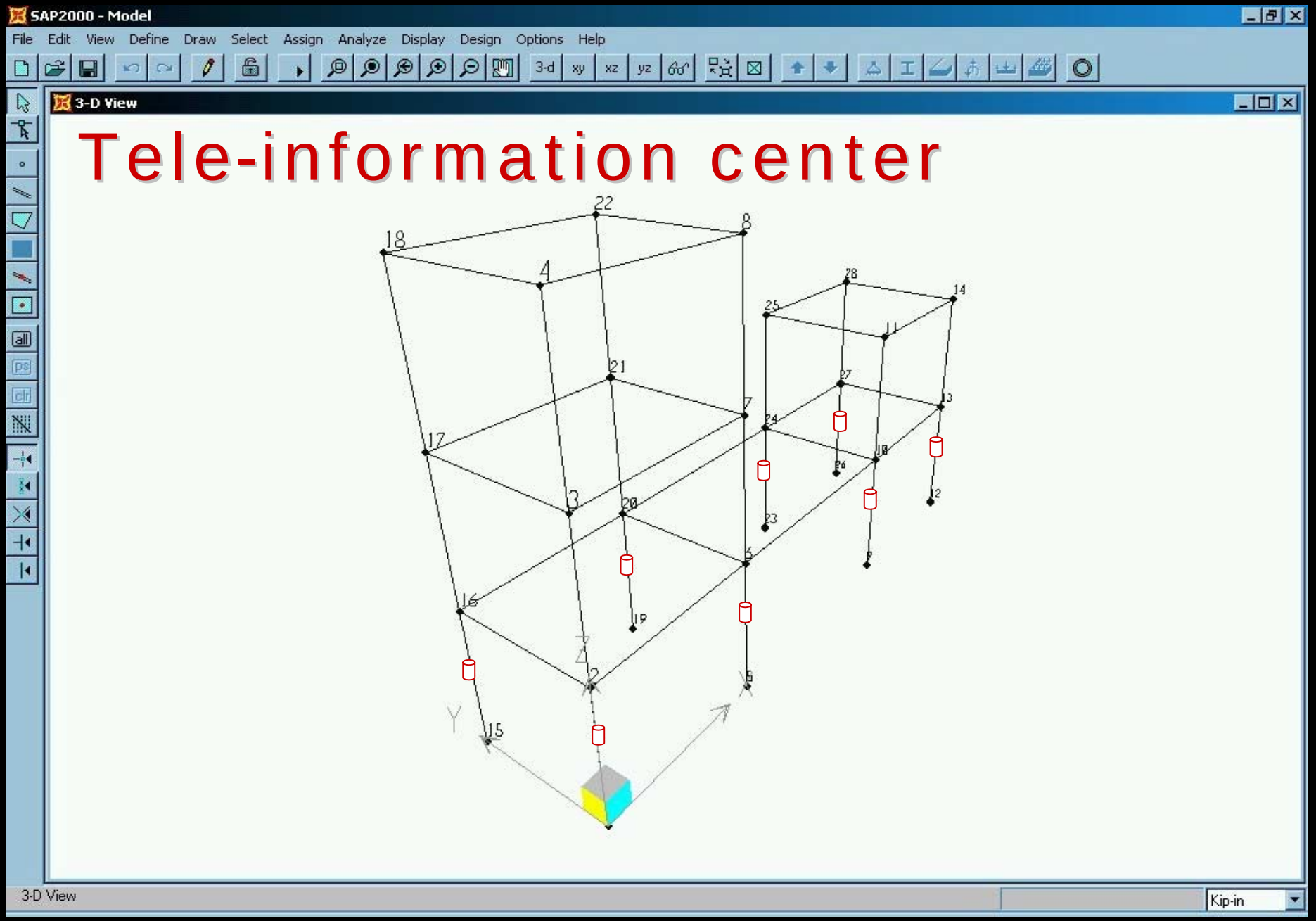
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3-D View
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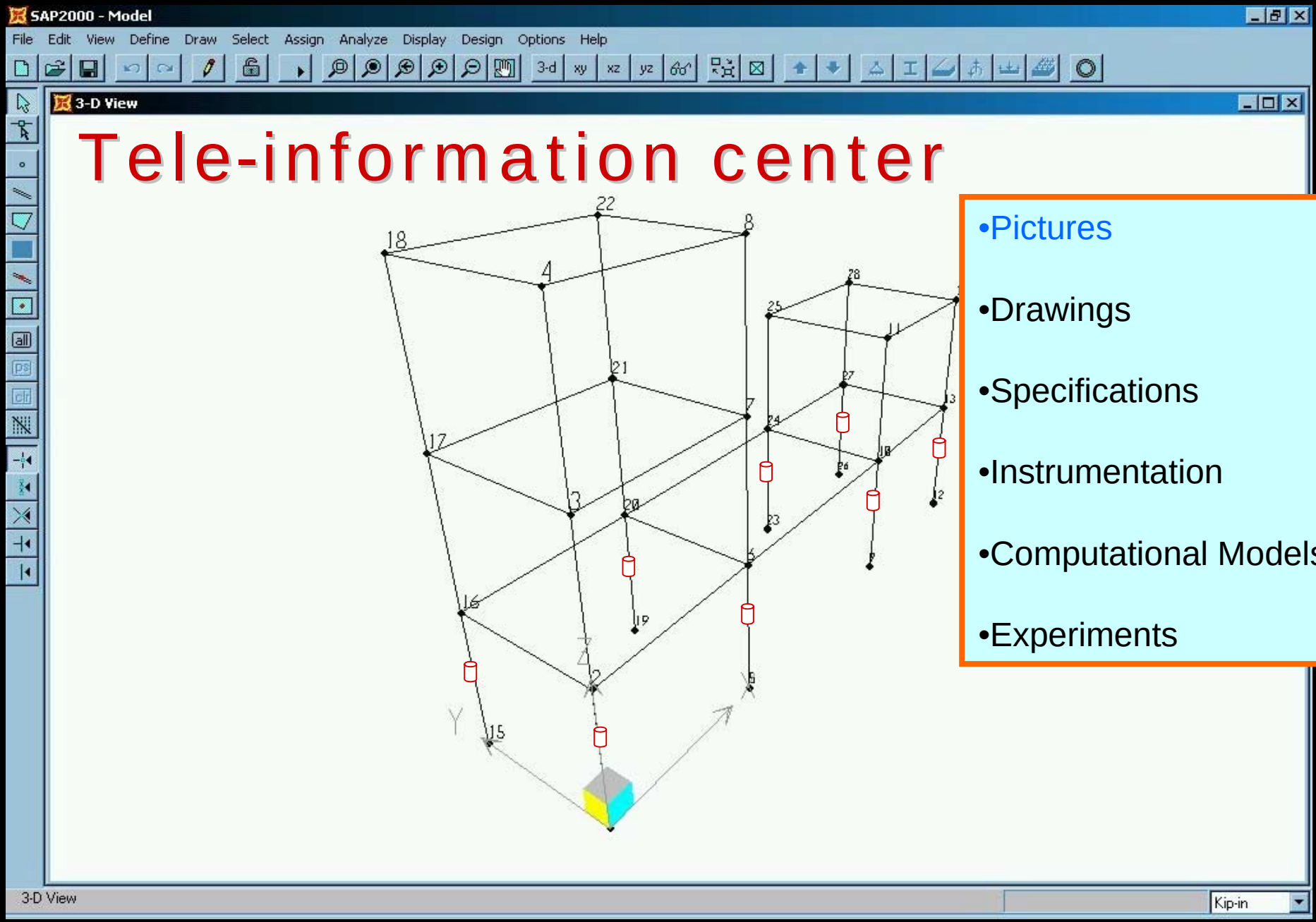
Tele-information center



- Pictures
- Drawings
- Specifications
- Instrumentation
- Computational Models
- Experiments

Benchmark Model - Task 4.1-4.2 Users networks - Year 4 of MCEER

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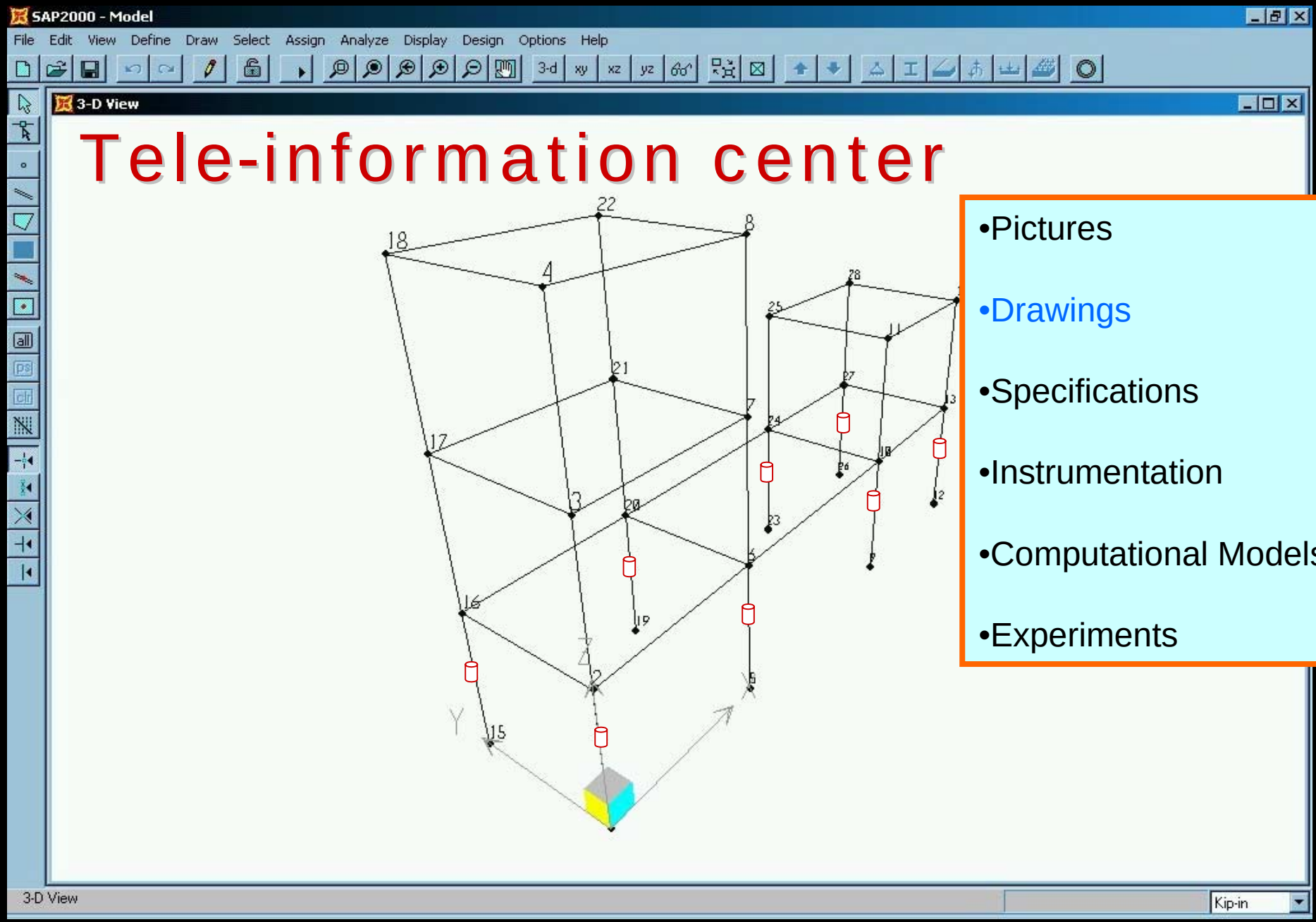
Tele-information center



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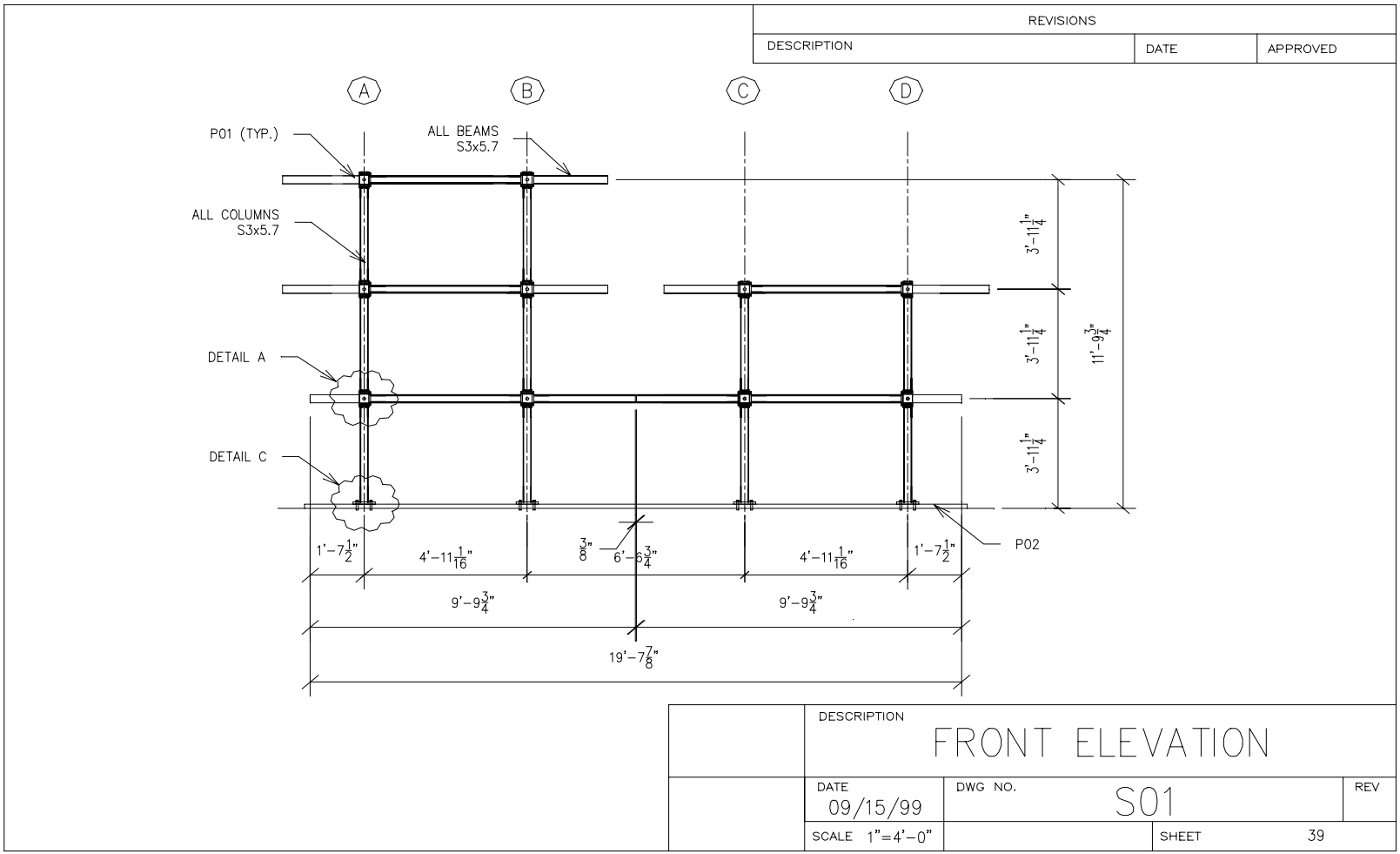
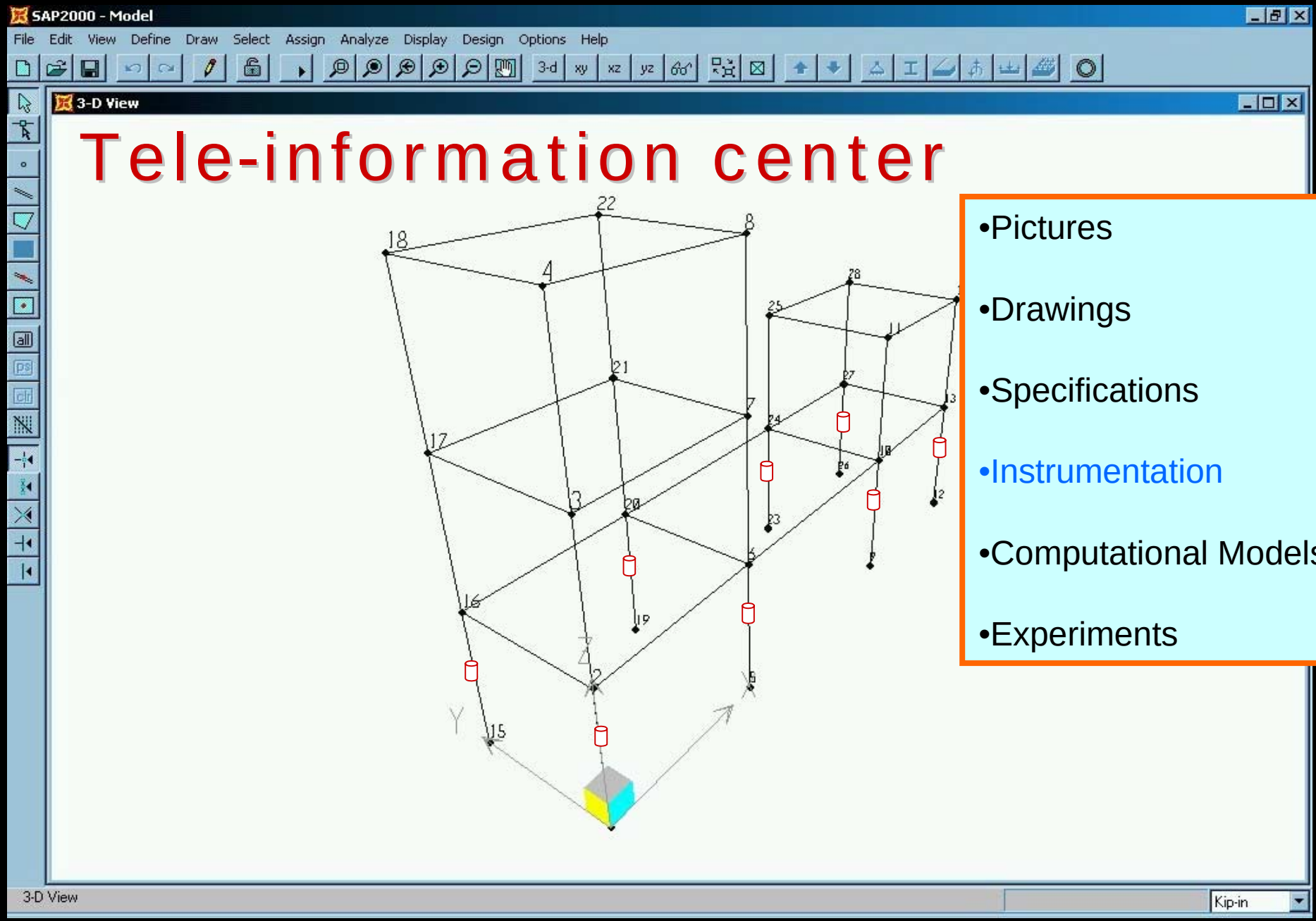
Model Structure



Tele-information center



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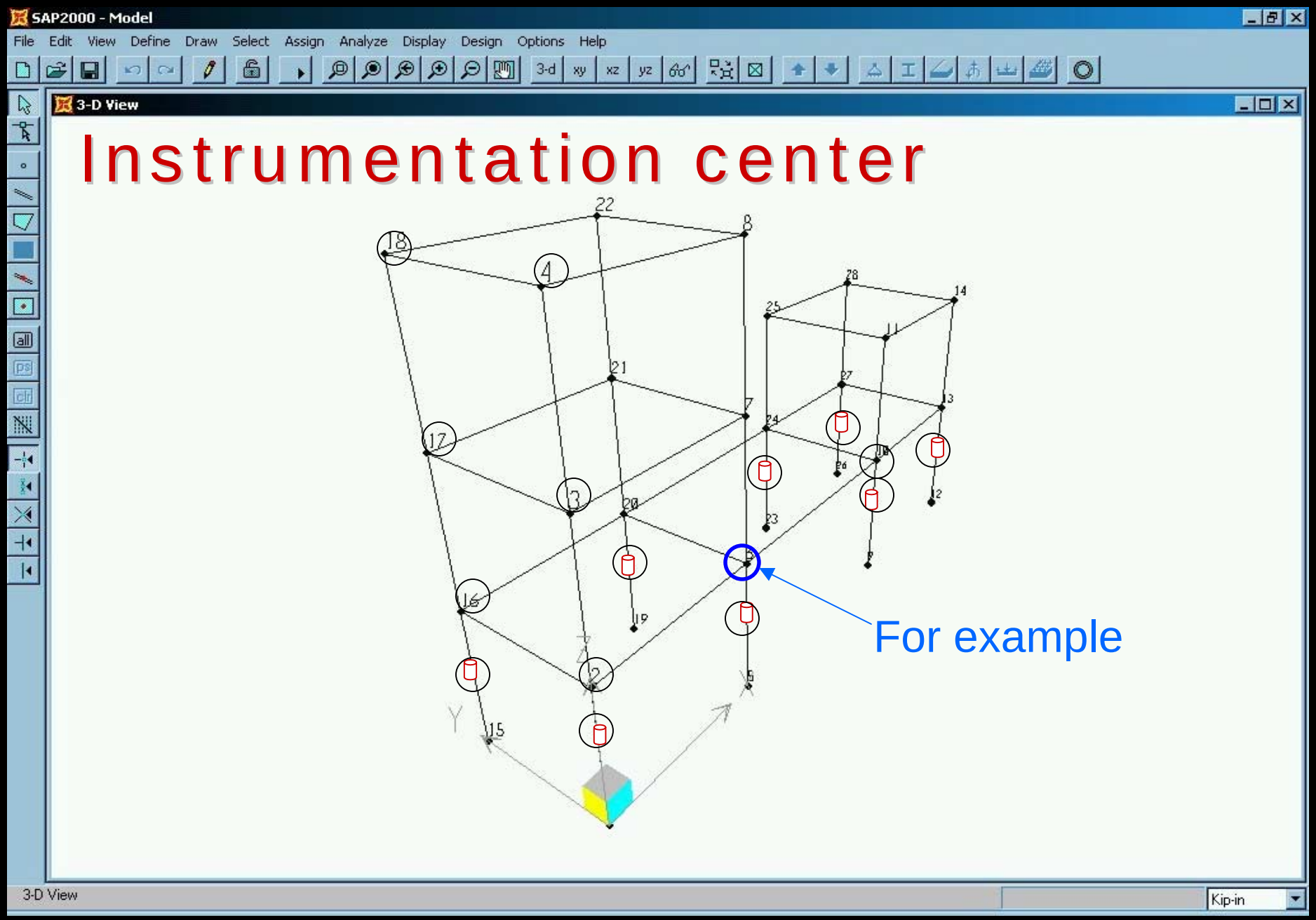
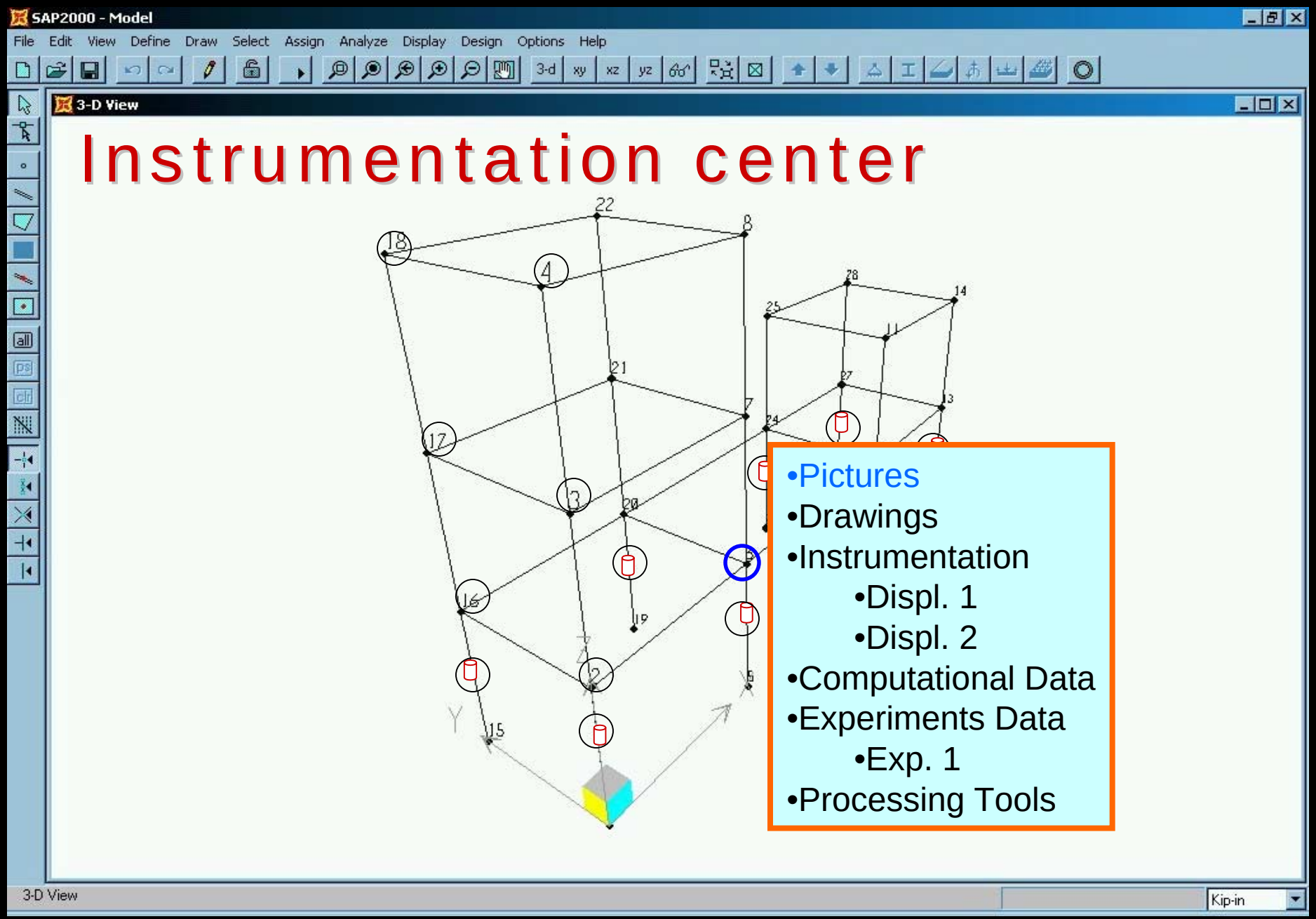
Instrumentation center



Instrumentation center



- Pictures
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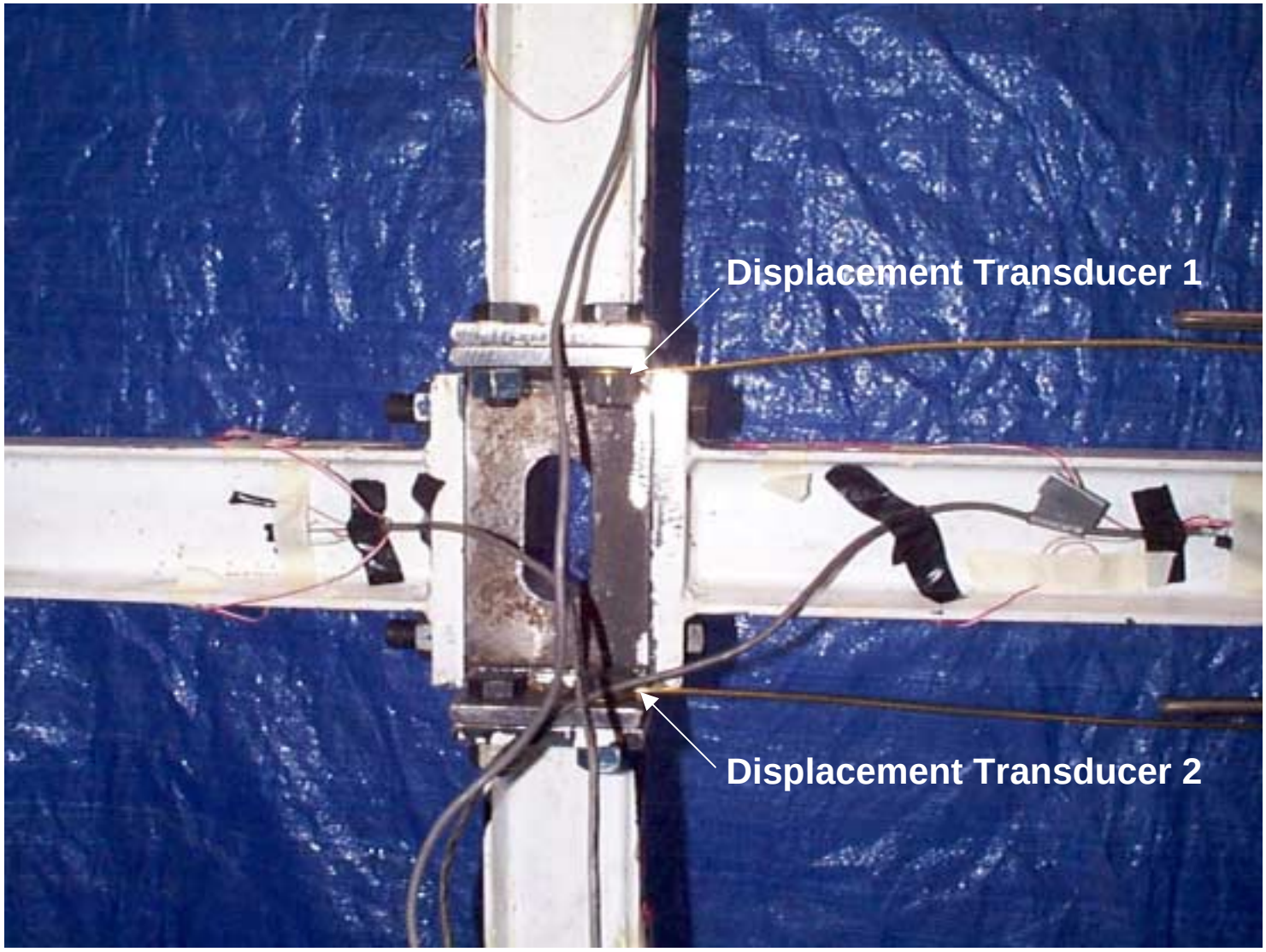
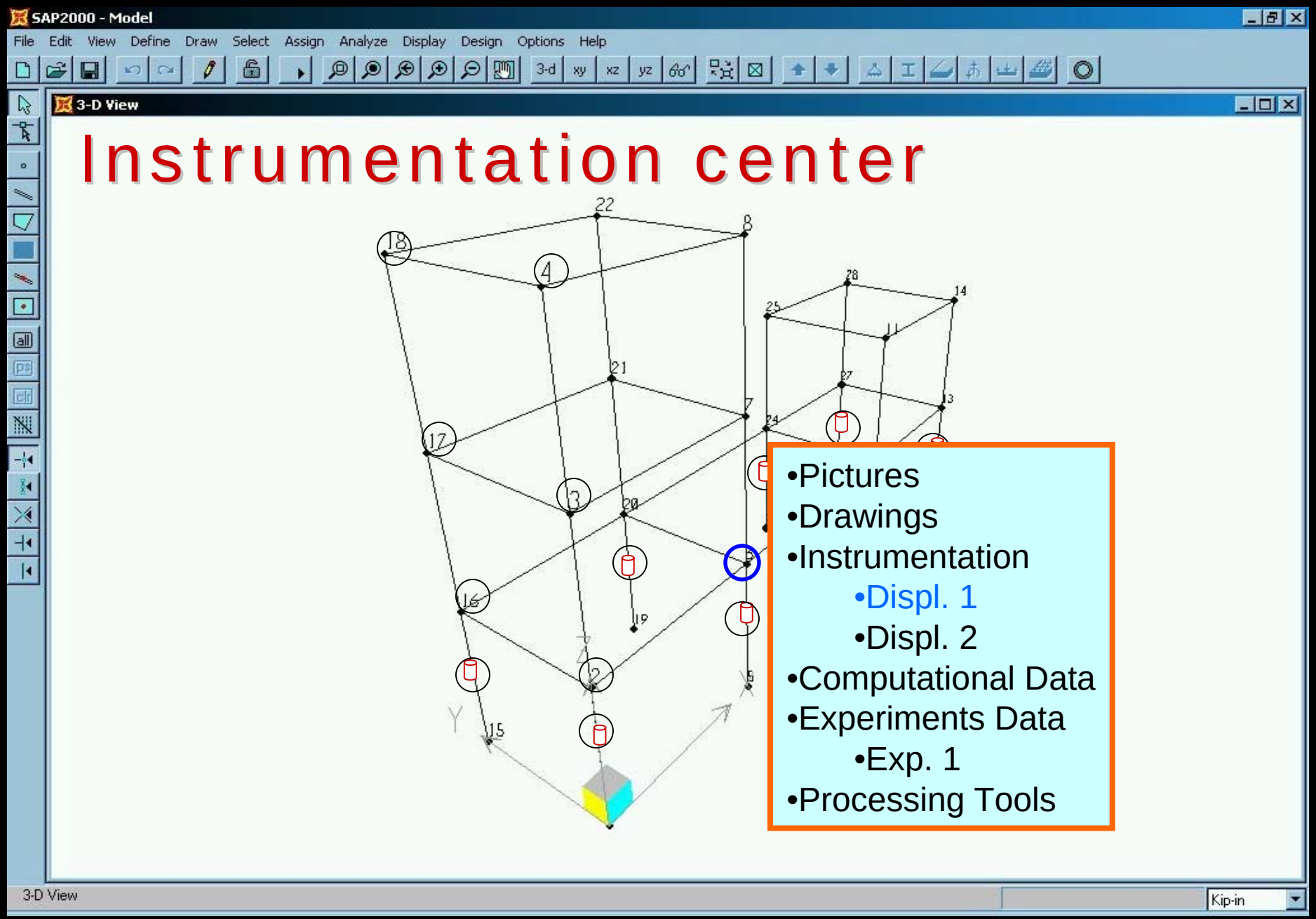
- Instrumentation
  - Displ. 1
  - Displ. 2
- Computational Data
- Experiments Data
  - Exp. 1
- Processing Tools

Location of Sensor



Instrumentation center



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Instrument Information

Temposonics

Type: Temposonics™II Linear Displacement Transducer

Description: Measure displacement with a high degree of resolution by precisely sensing the position of an external magnet.

Features:

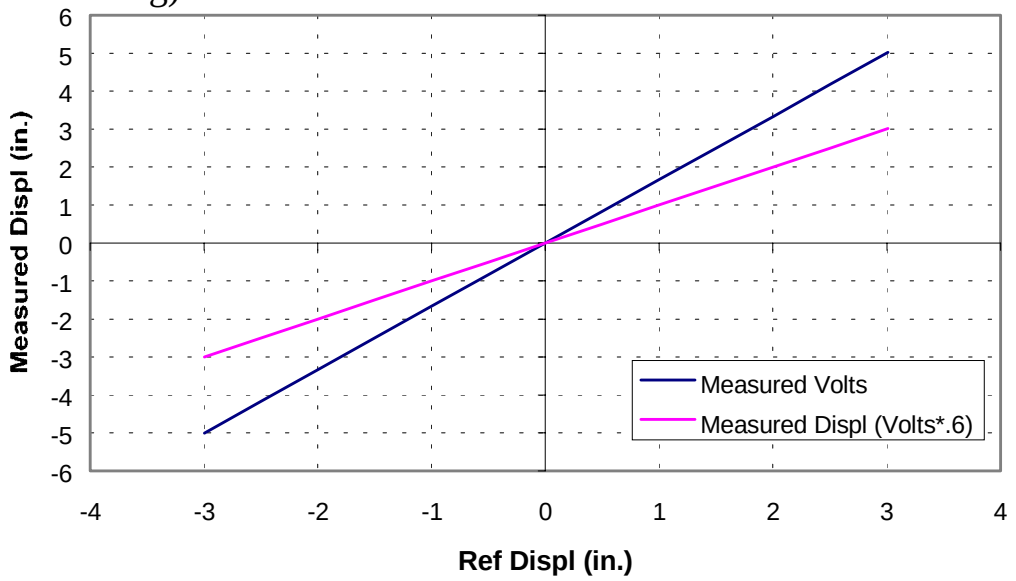
- Stroke lengths of ± 6 inches.
- Multiple position sensing capabilities
- Variety of output formats (digital and analog)
- Sensitivity of 0.6 in./volt

Calibration:

Reference Instrument:
Digital meter Model x No 2432

Last Calibration:
Jan. 30, 2000 (ref.)
Jan. 30, 2001 (this)

Calibration of Reference Temposonic



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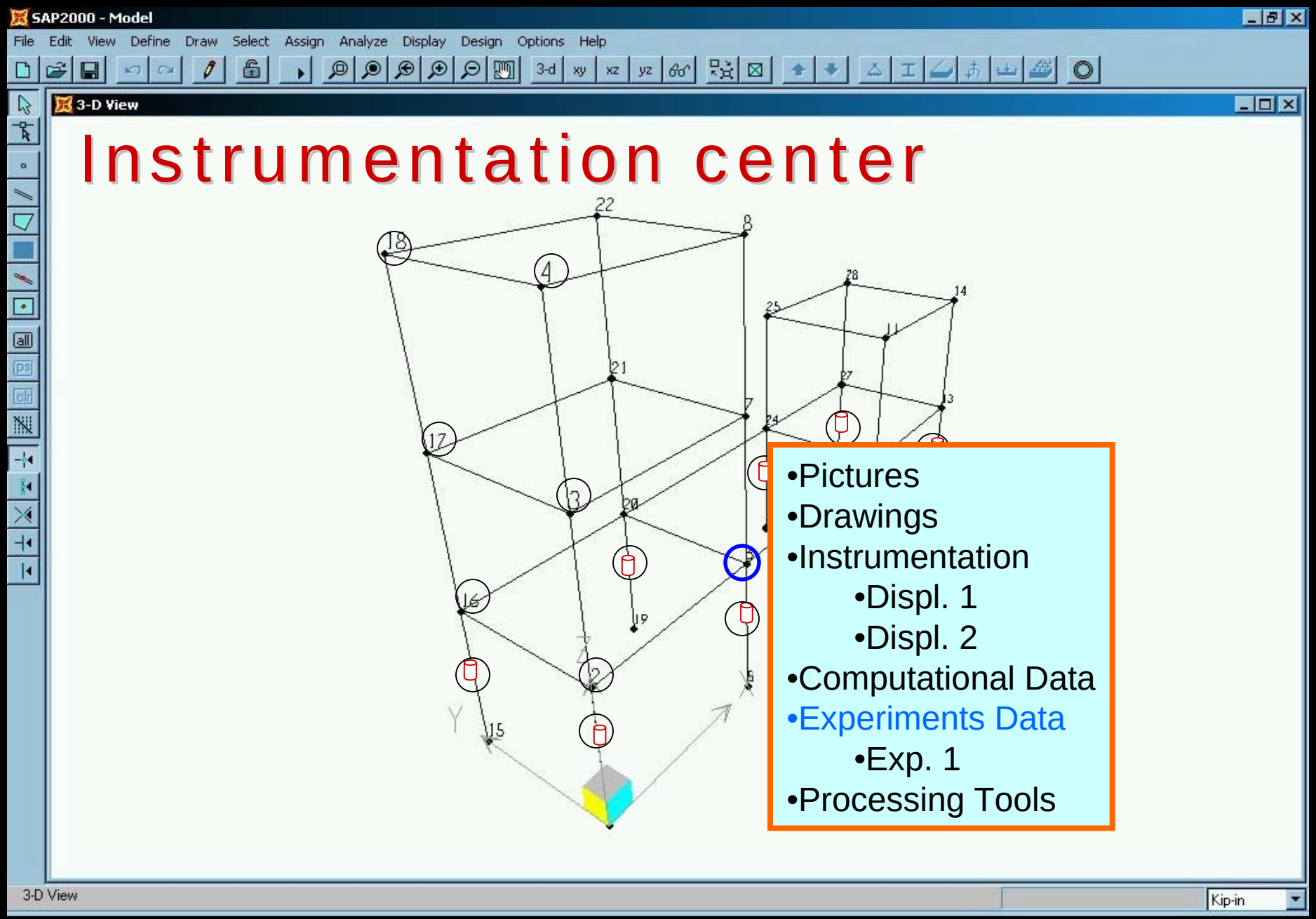

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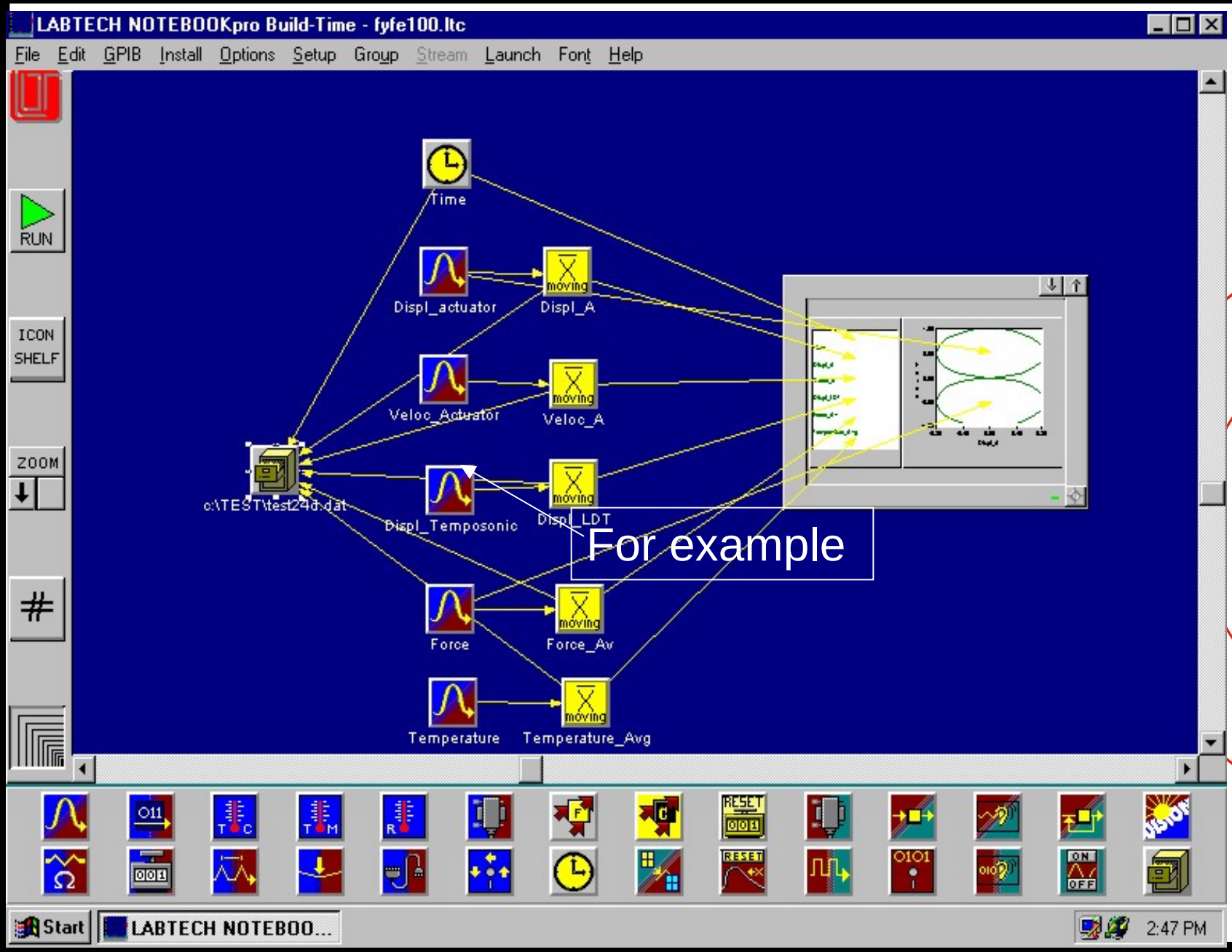
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