

NEES instrumentation: some issues for host facilities

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Common Instrumentation Issues

- Data Acquisition Network
 - architecture, hardware selection
 - acquisition and visualization software
- High Speed Digital Video and Stereoscopy
- Fiberoptic strain sensors
- Metadata and automatic data reports
 - TEDS (Transducer Electronic Data Sheets)
- Need for large number of sensors
- MEMS
 - Accelerometers, pressure, proximity, temperature...



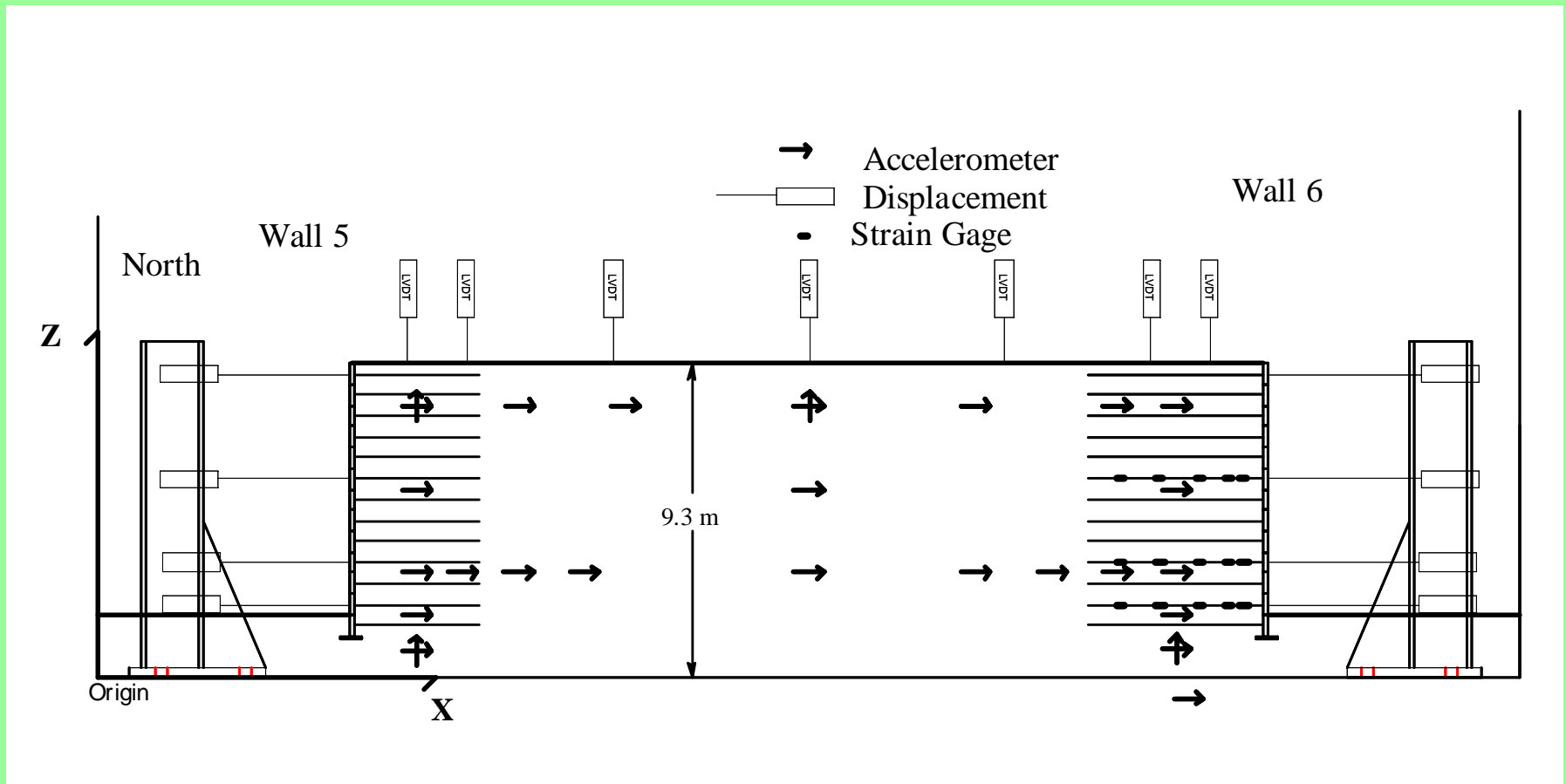
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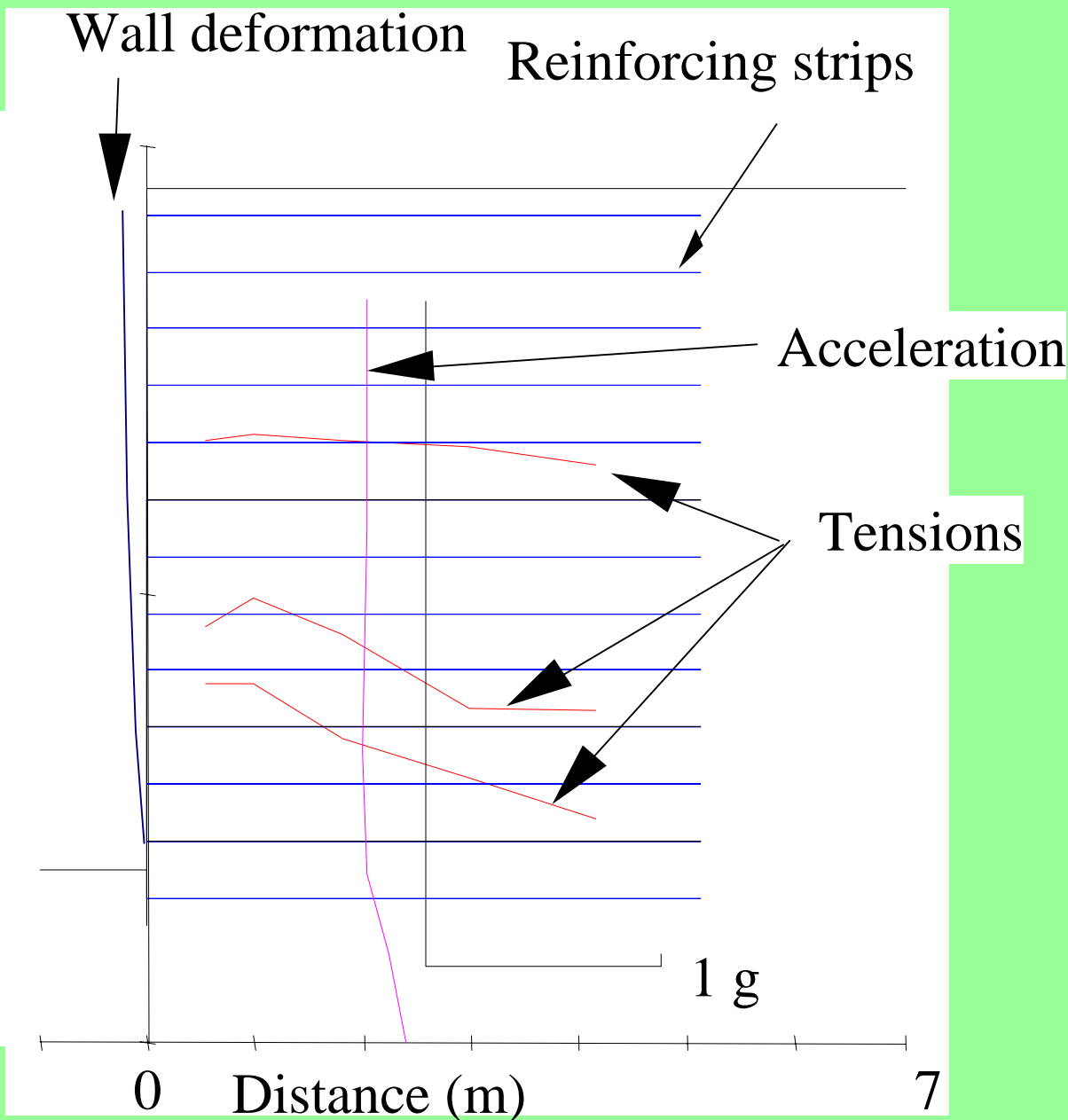
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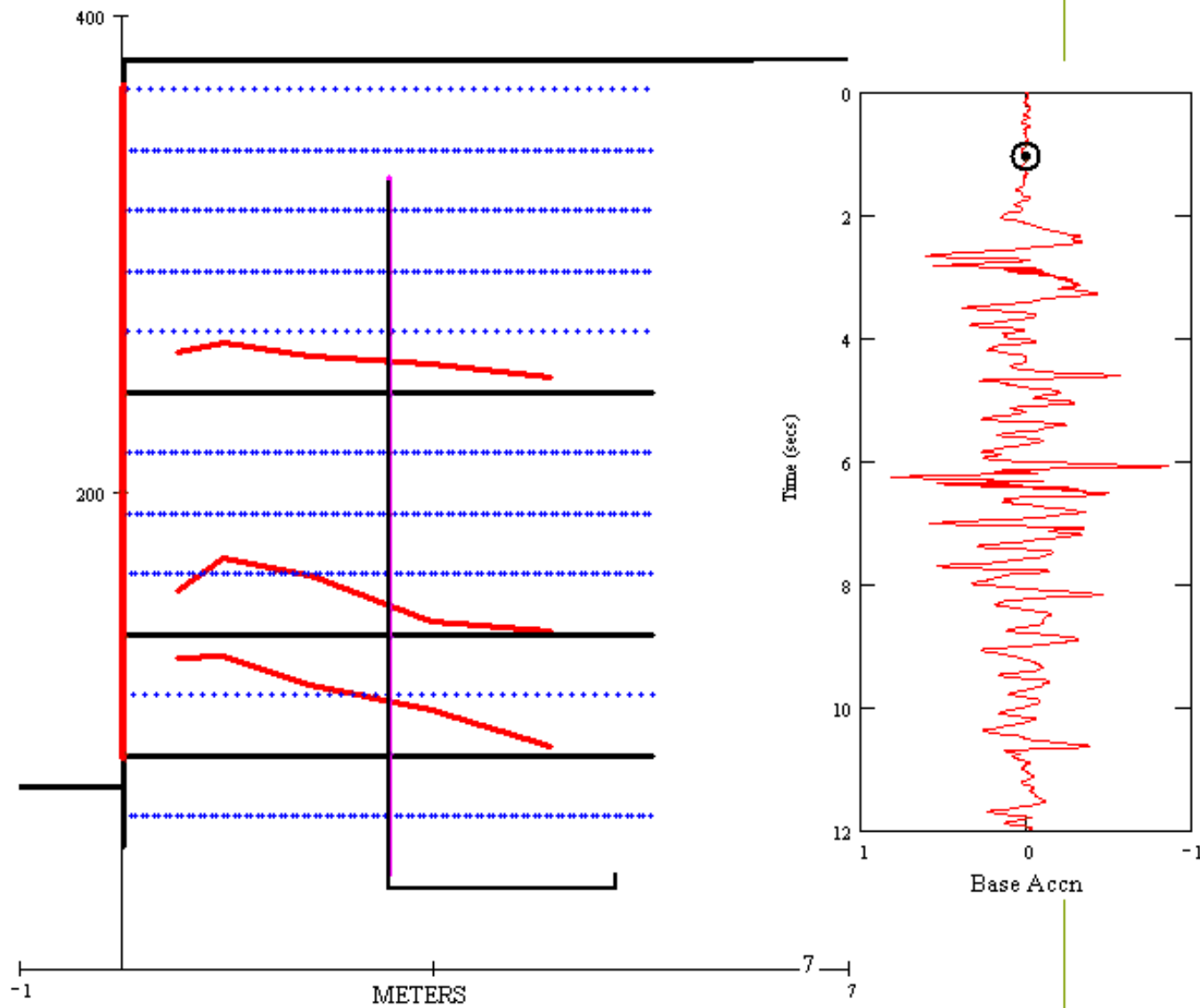


MSE Instrumentation

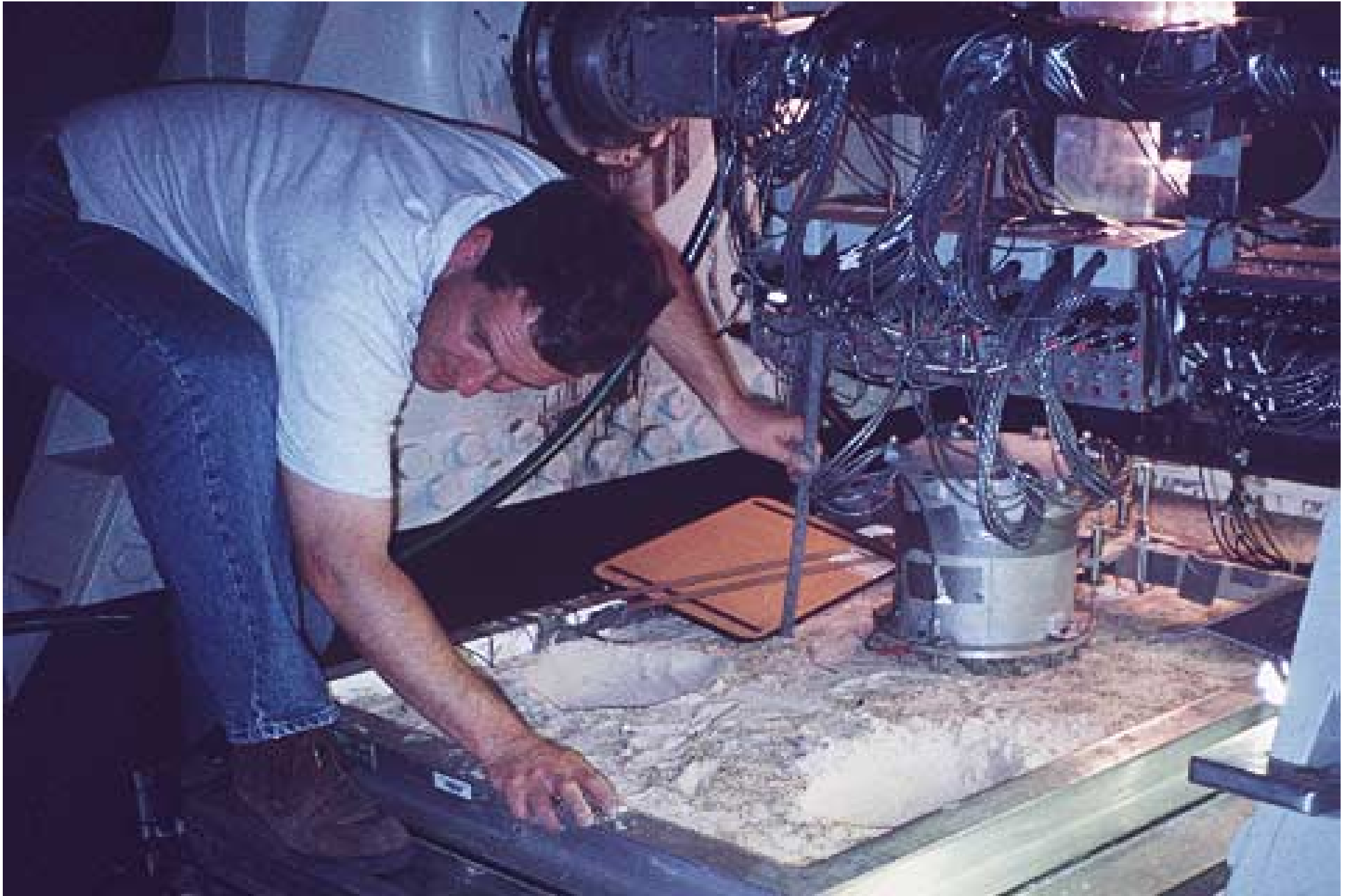


Animation of data from a centrifuge test involving mechanically stabilized earth wall.

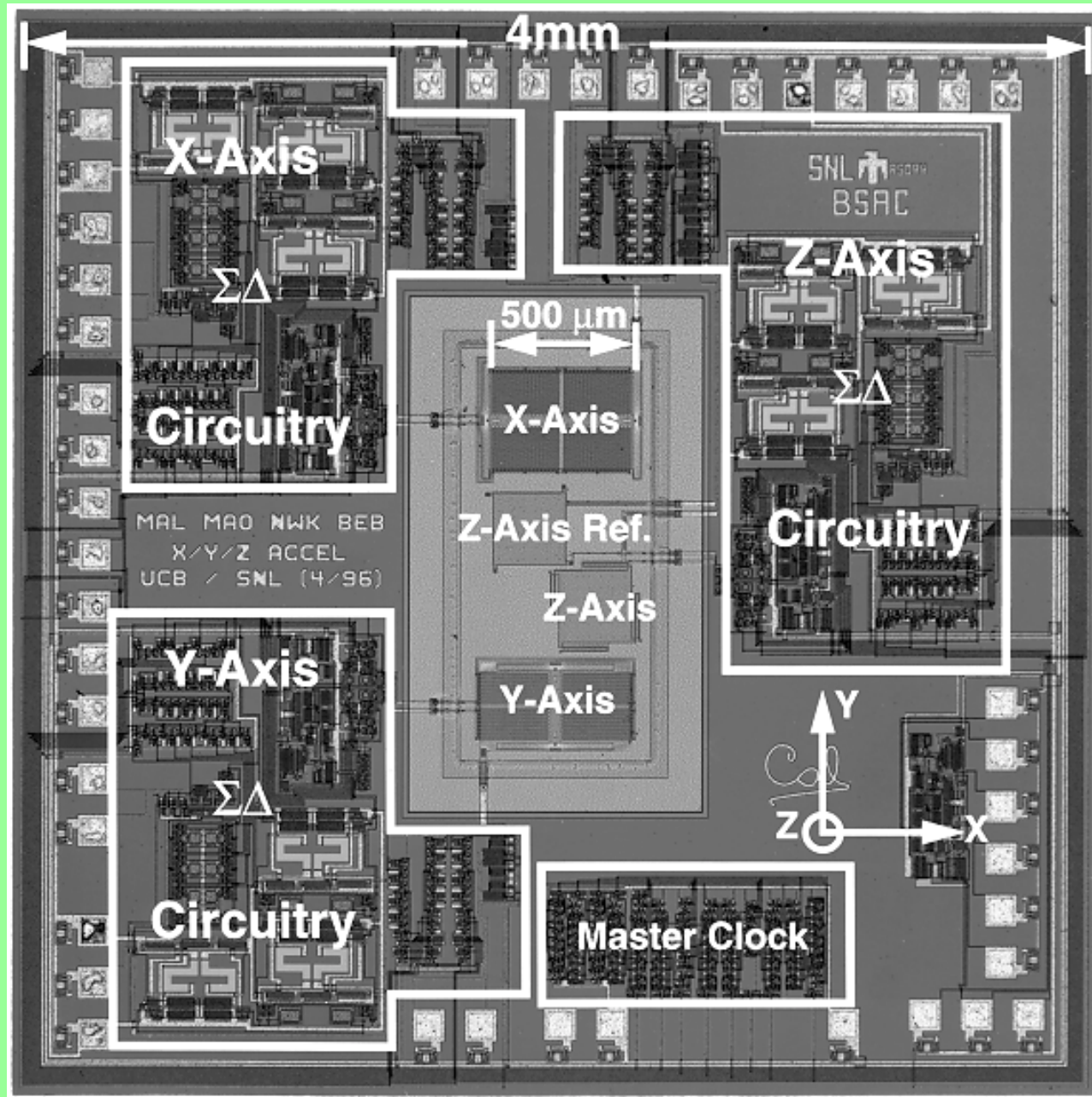
A simple cartoon animates distributions of tensions in reinforcing strips, acceleration distribution and wall deformation. This allows a researcher to efficiently check and digest data from a large number of sensors.



MSE03N.avi

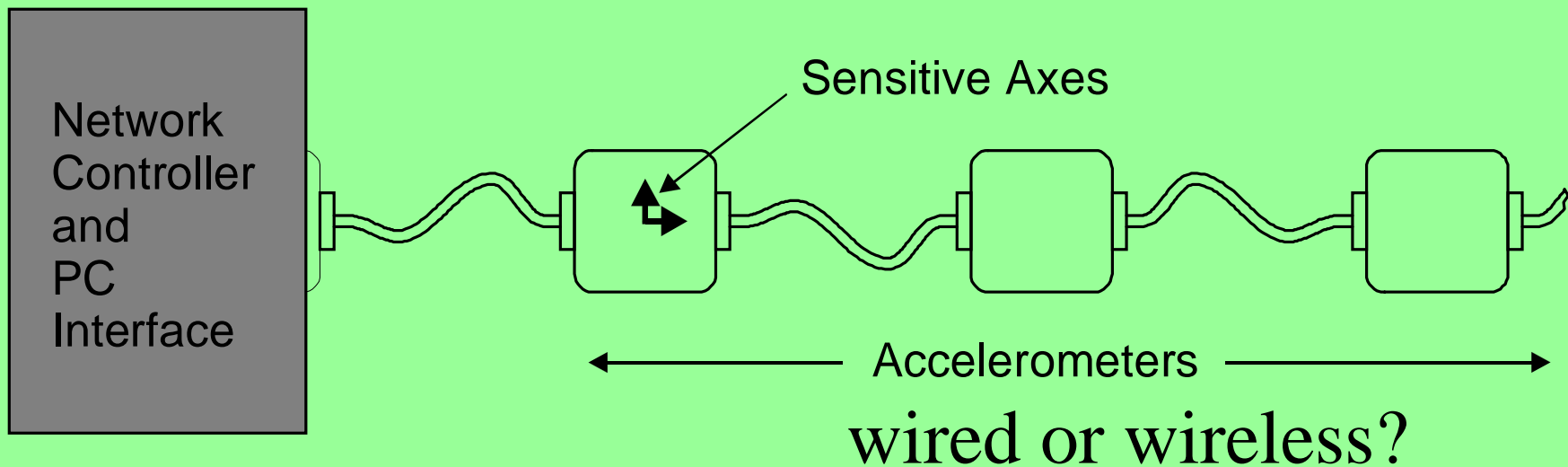
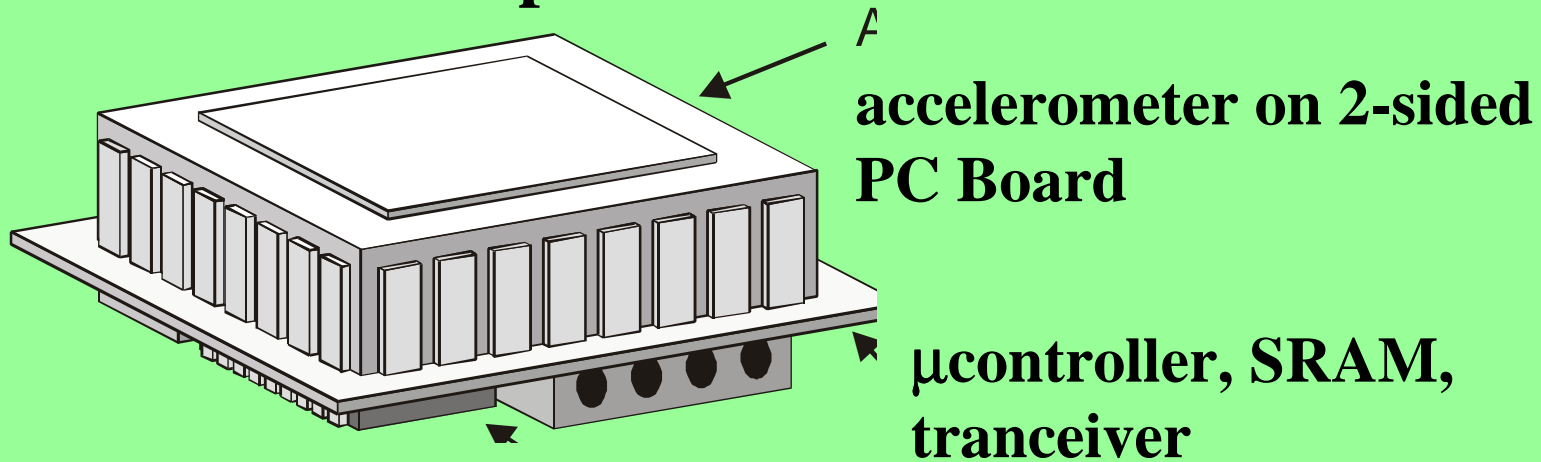


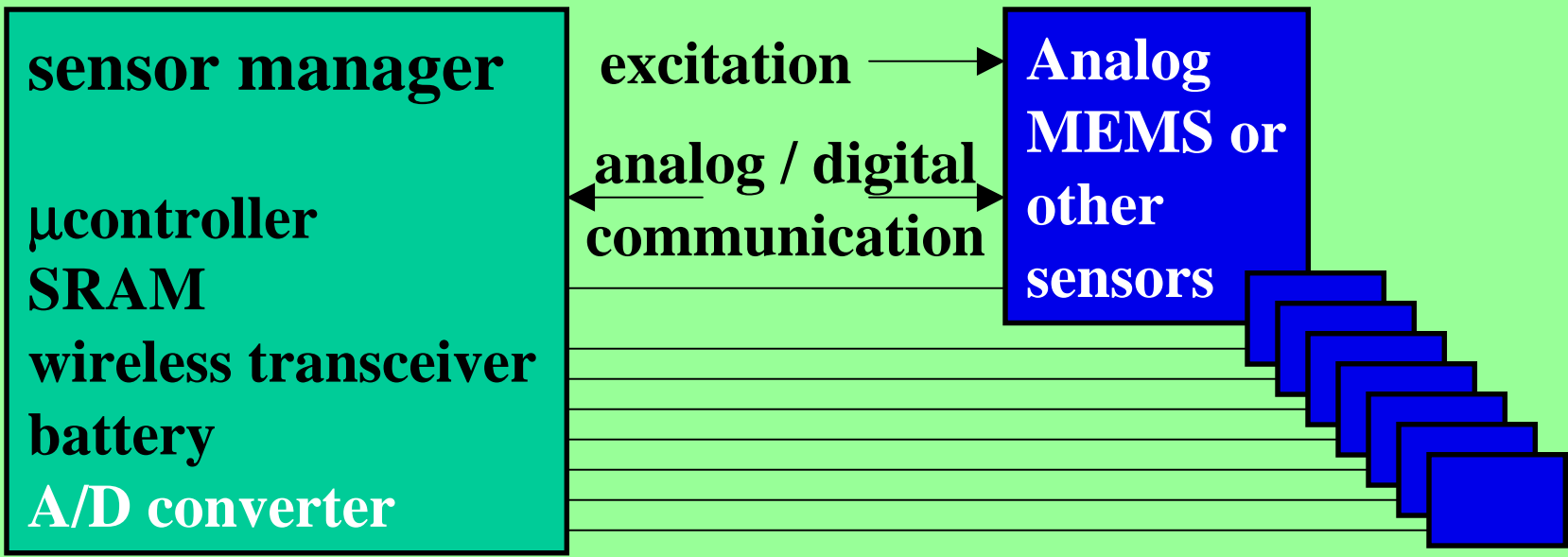
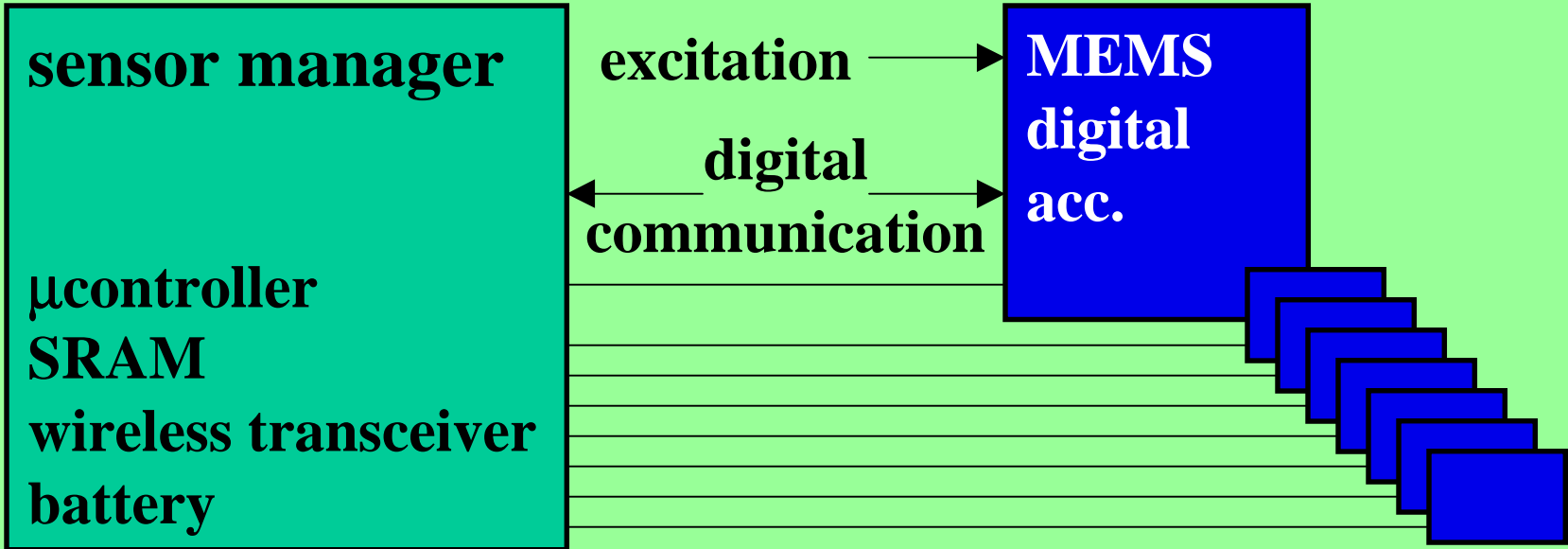
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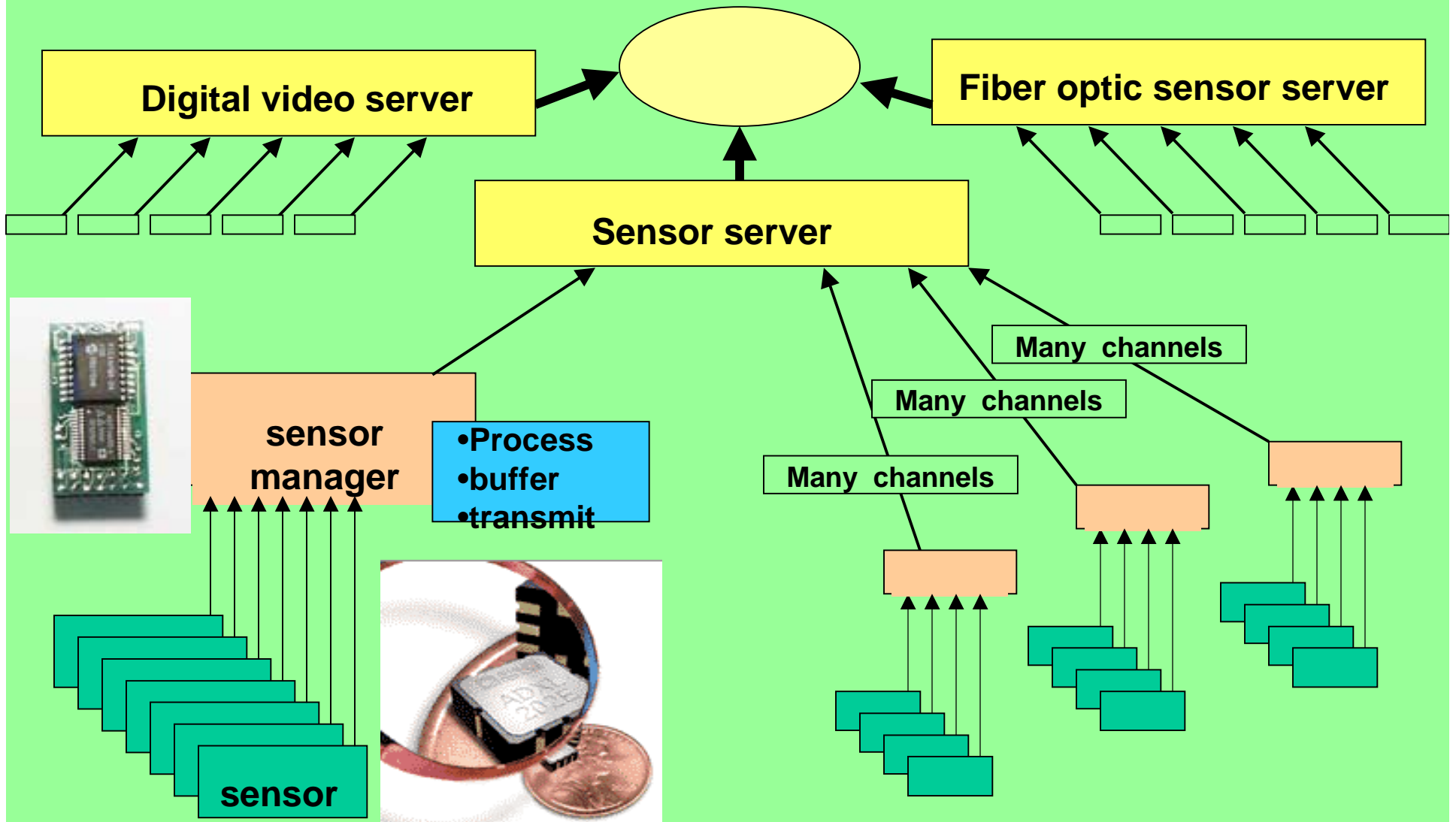
MEMS
accelerometer
developed at UC
Berkeley

UCD NEES Proposal: 20 dual-axis MEMS accelerometers per cable



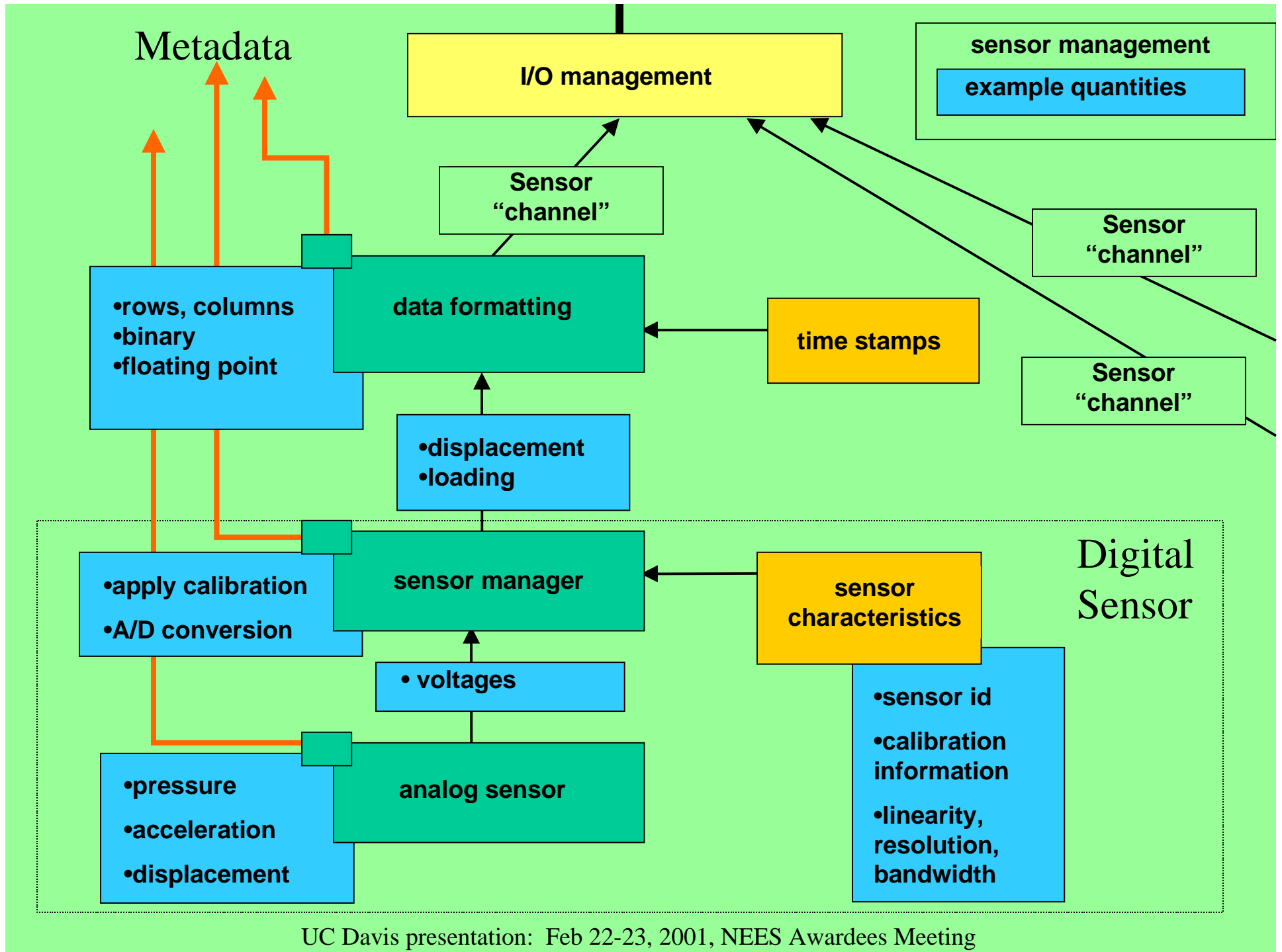


CURRENT THINKING ON DAQ ARCHITECHTURE



MEMS ISSUES

- Are existing sensor specifications acceptable?
 - Must NEES pay for MEMS development?
 - Packaging?
- Wireless sensor
 - Effect of battery on size
 - Reliability of submerged wireless
- Wireless sensor manager?
- MEMS \neq small package
- Documentation of 100's of sensor locations



Questions

- **Would it be practical to assign different NEES sites to pursue different technologies and report back?**
- **What are the mechanisms for sharing and rewards for sharing new sensor and instrumentation technology?**
- **Can a cooperative community convey a larger market to Information Technology industries so that they are willing to invest in development of new sensors for NEES researchers?**
- **Can NEES afford a top instrumentation engineer that would serve all NEES sites?**

Final Question

- **What is the interface between host facilities and system integrator?**
 - node with specified data protocols
 - fuzzy boundary that penetrates host facilities
 - data acquisition
 - data processing
 - automatic metadata
 - visualization tools

