Fourth International Workshop on Sample Environment at Neutron Scattering Facilities

Alignment Techniques for Installing Neutron Scattering Instruments Using Modern Laser Interferometry

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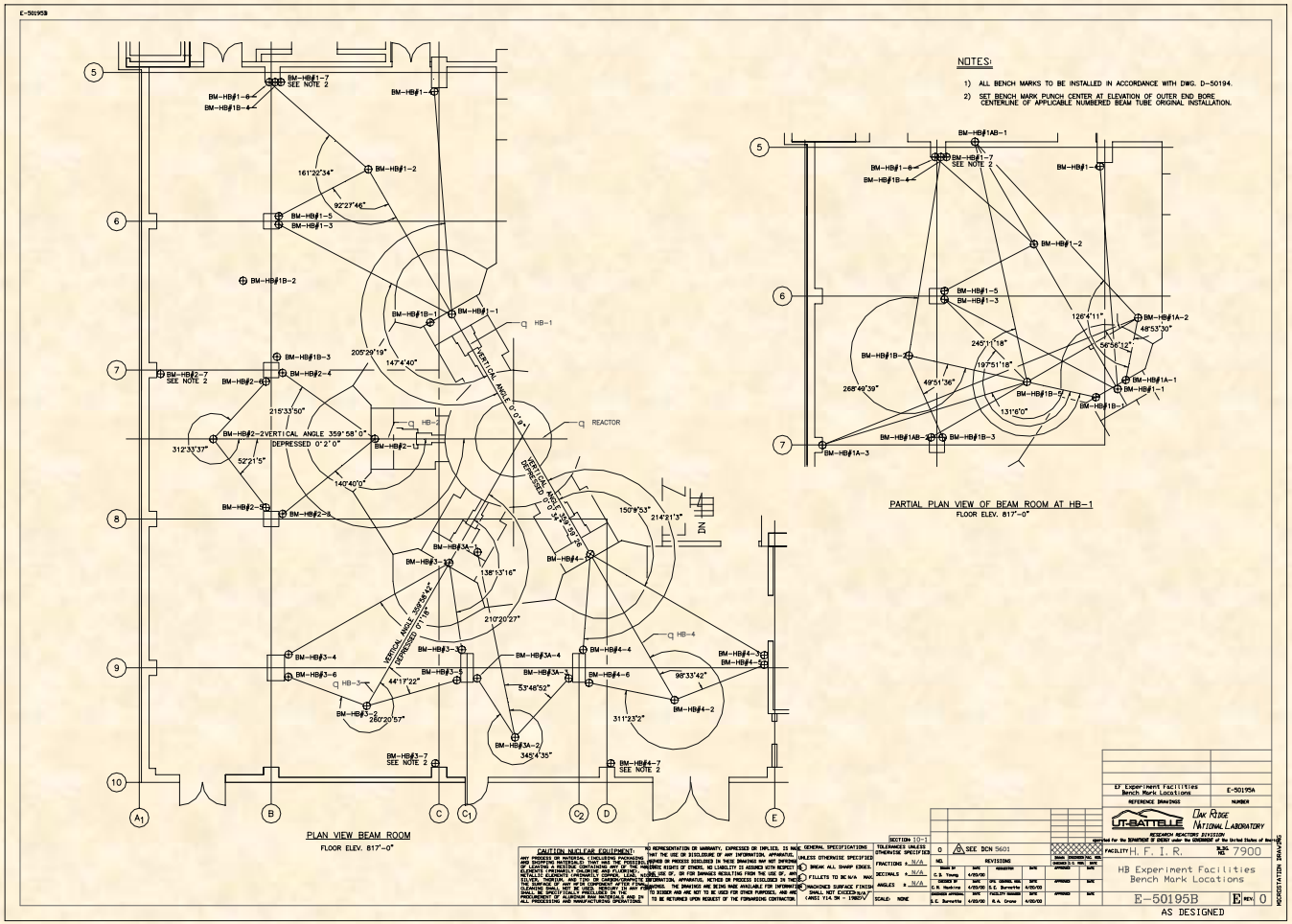
- **Why Create a Coordinate System?**
- **Developing the Coordinate System**
- **Some of our Installed Instruments**
- **Economic and Schedule Benefit**

Why Create a Coordinate System ?



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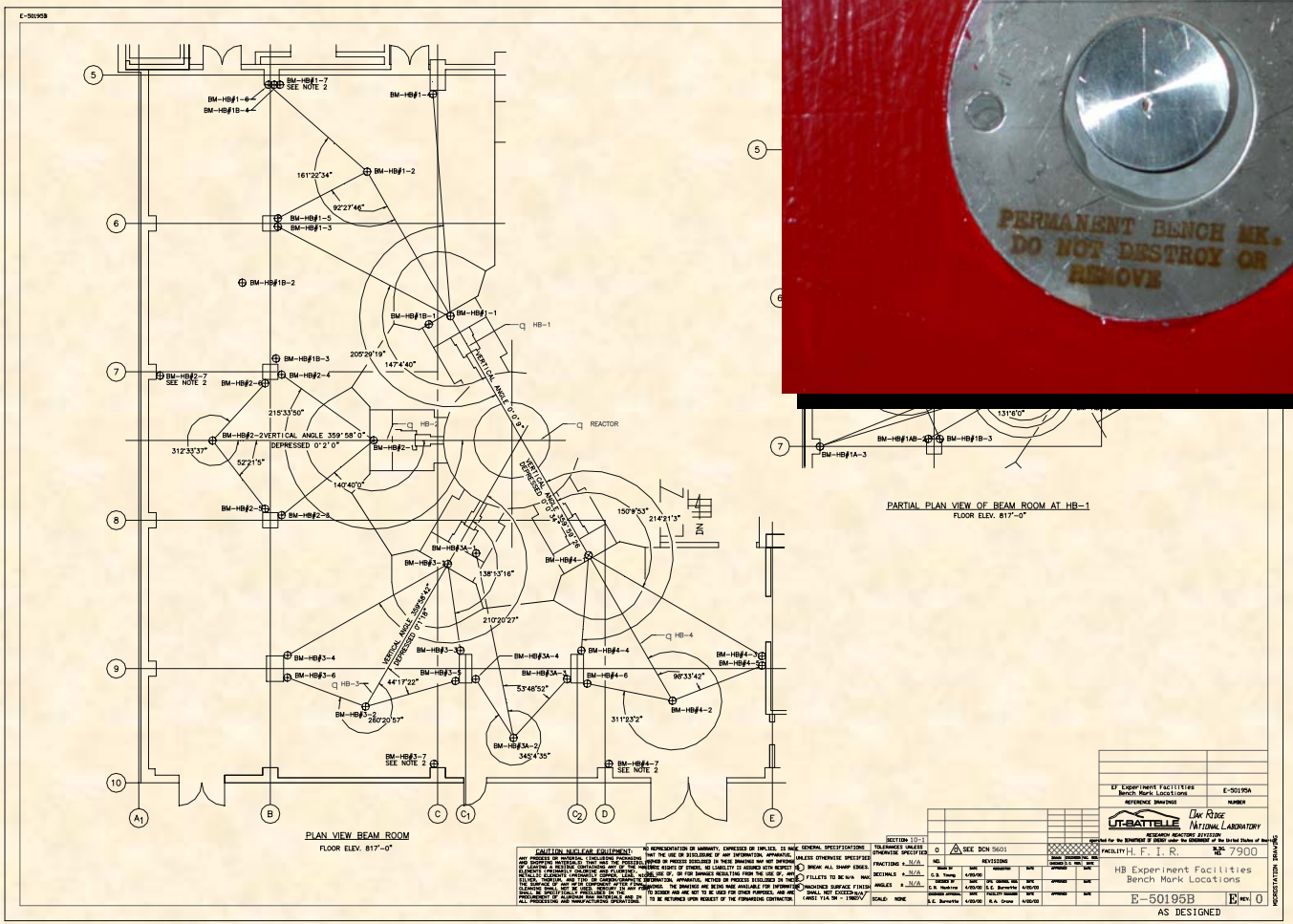

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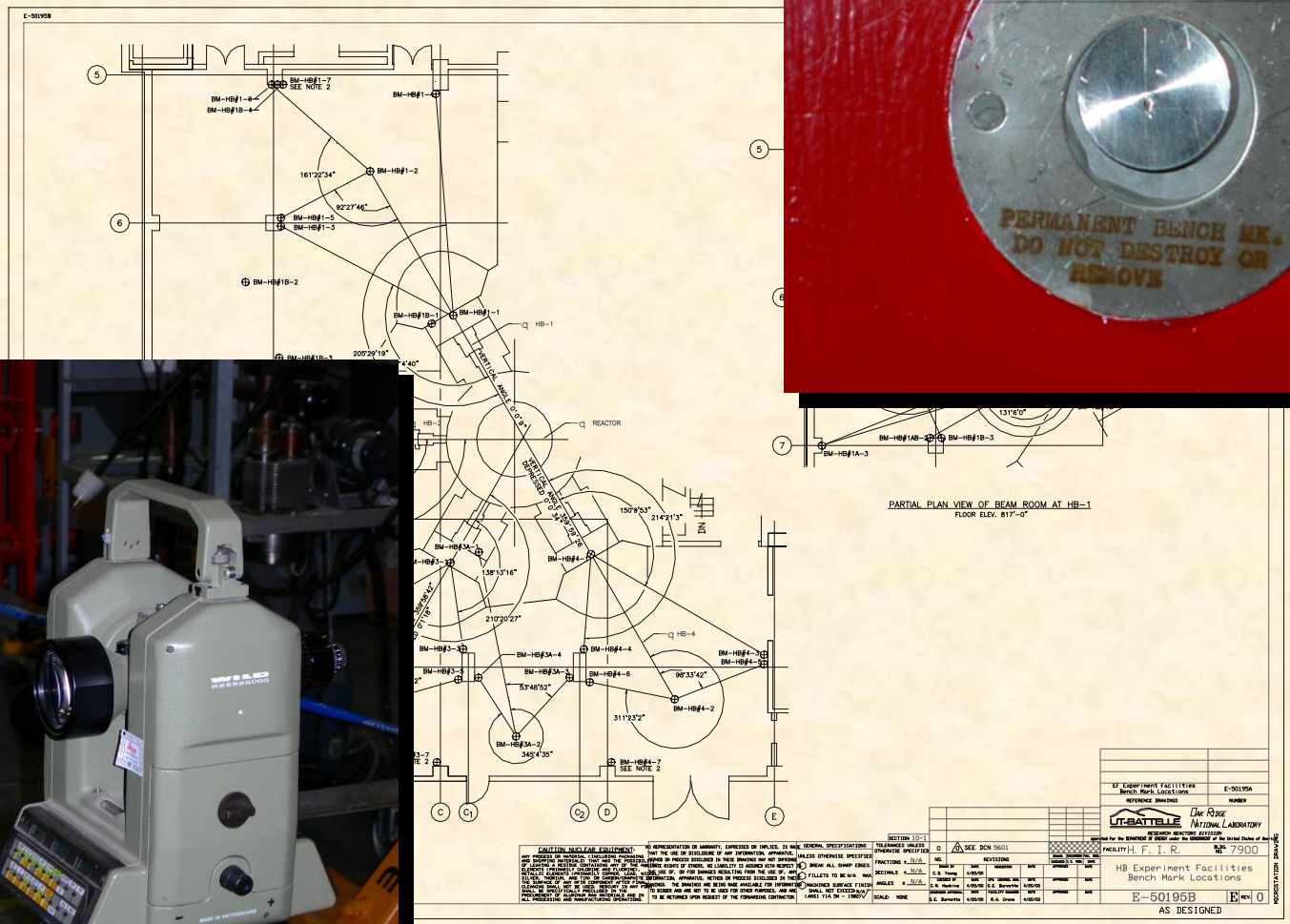
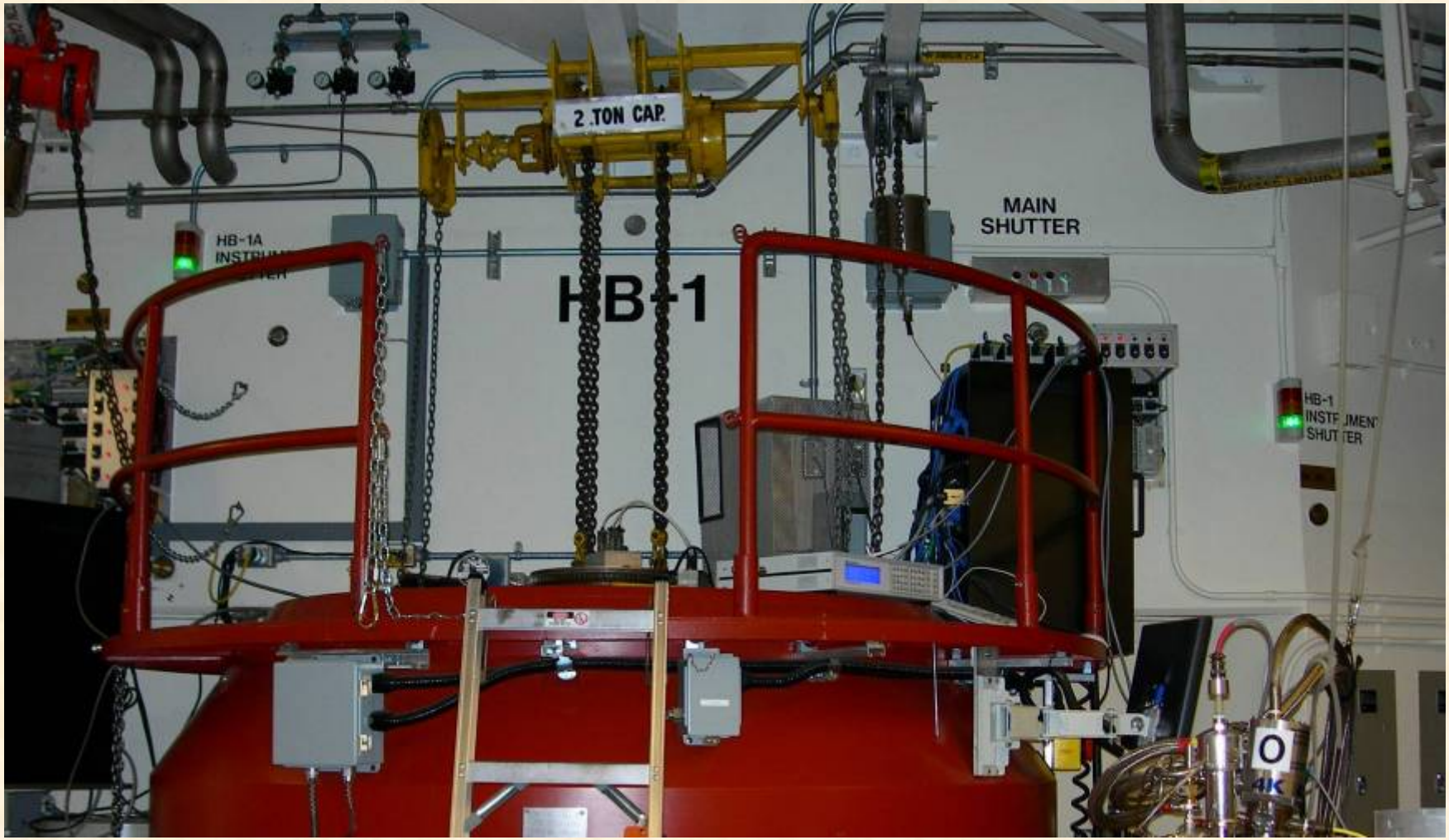


Why Create a Coordinate System ?

New *or* additional components are installed to the **coordinate system**, not existing surfaces, thereby eliminating tolerance build-up and increasing the overall mechanical accuracy of the instrument.

Our virtual coordinate system is consistently revisited with accuracies of +/-0.05 mm and for some instruments accuracies of +/-0.025mm are repeated.

DEVELOPING THE COORDINATE SYSTEM



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- It is paramount to have confidence in your permanent coordinate system!
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Cast Nodular Iron Columns, thermally stable and low residual stress from casting.

Spherical equalizing, self aligning washers under base plate to minimize stresses from installation and to provide air gap at floor.

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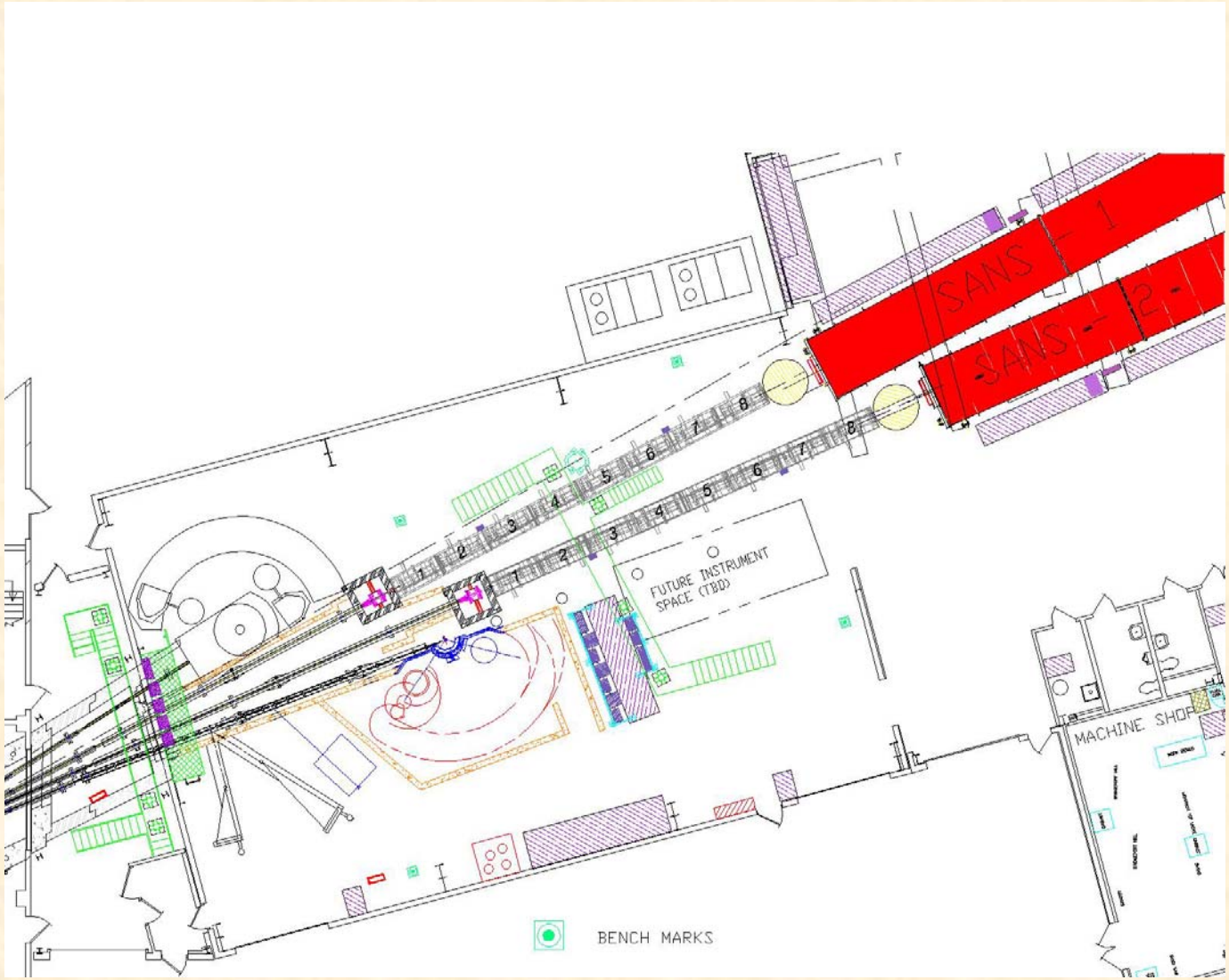

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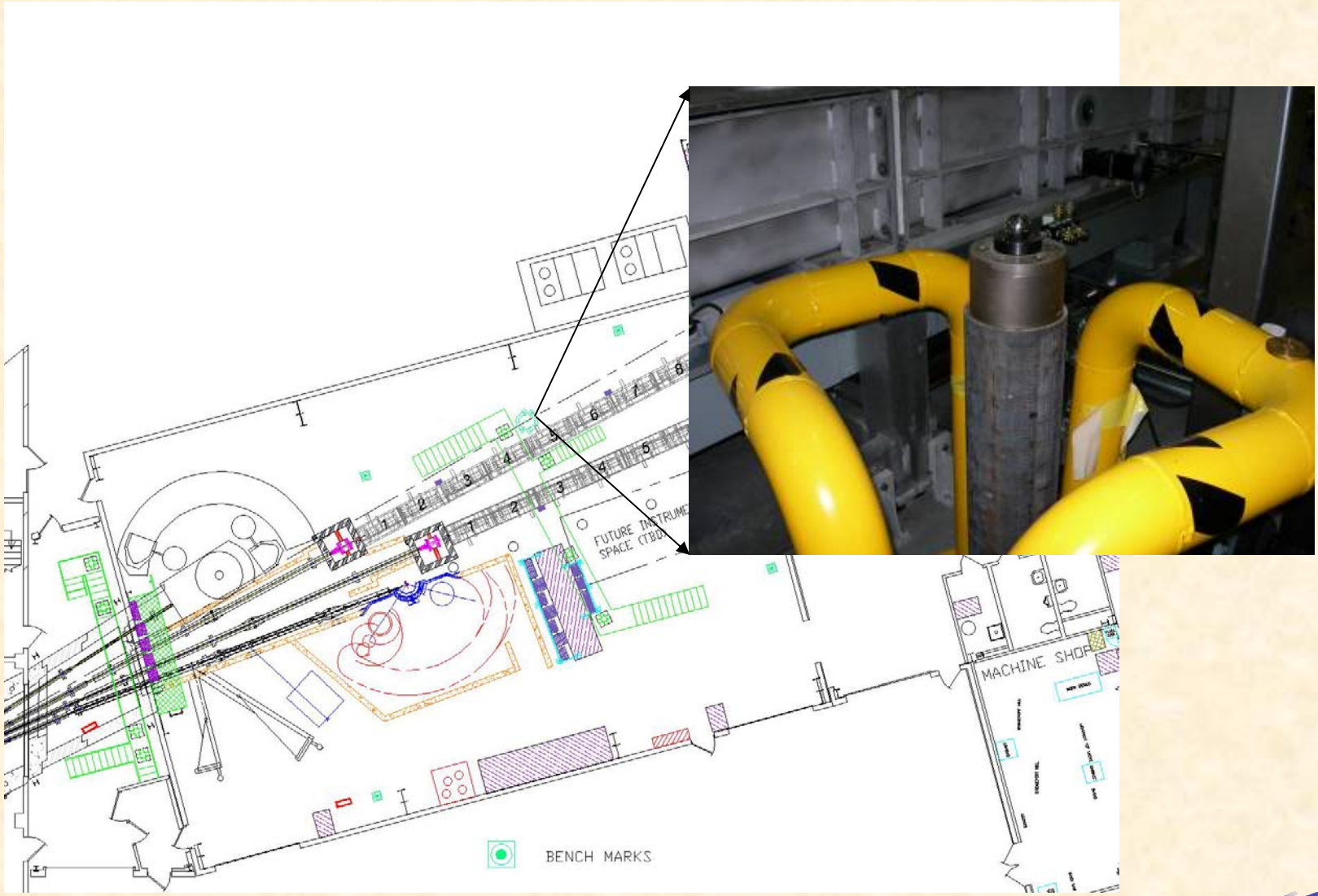
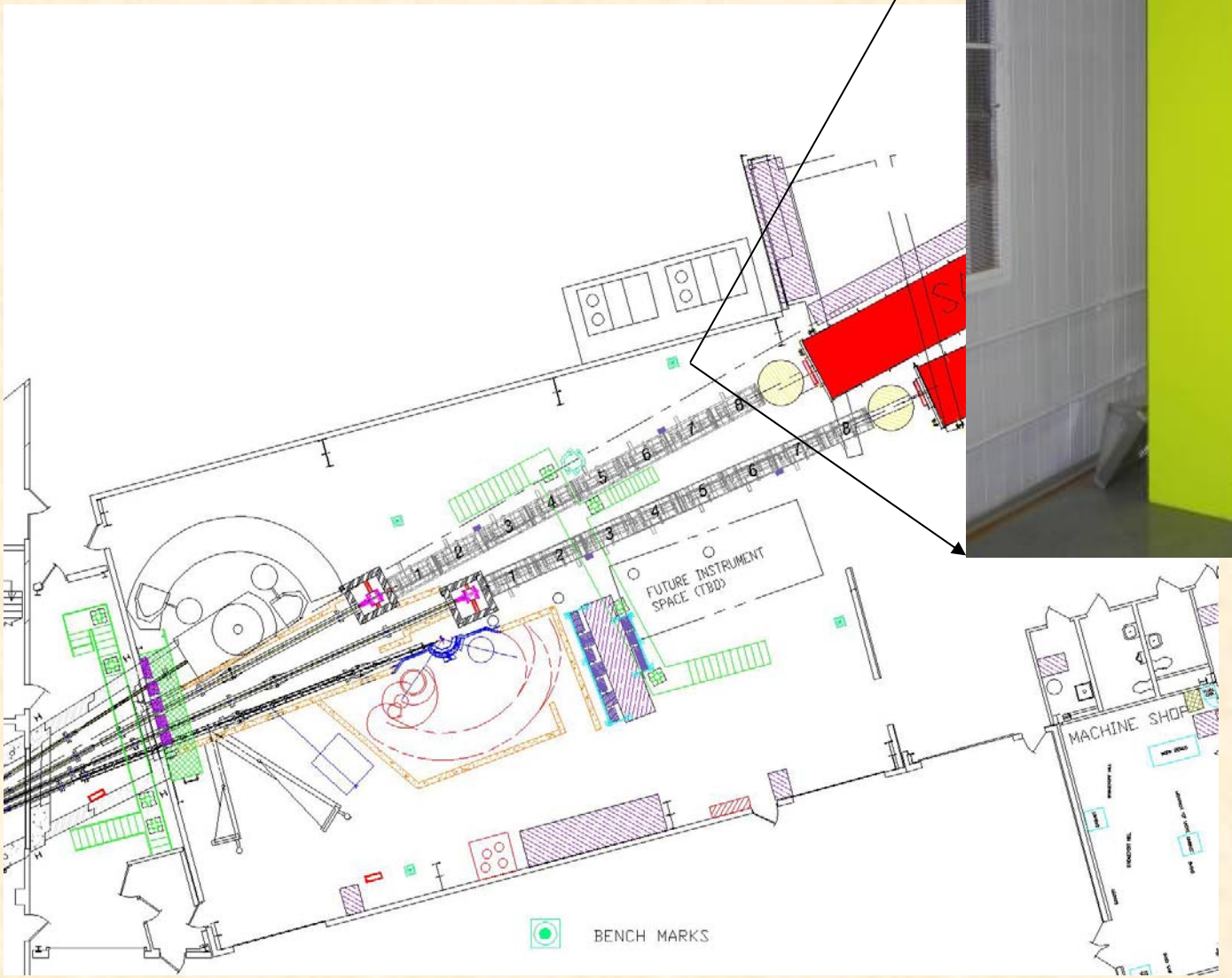


DEVELOPING THE COORDINAT



Our Installed Instruments

HB-1 Triple Axis Monochromator Shield

Our Installed Instruments

HB-1 Shield Support Rails

Our Installed Instruments

Installing HB-1

Our Installed Instruments

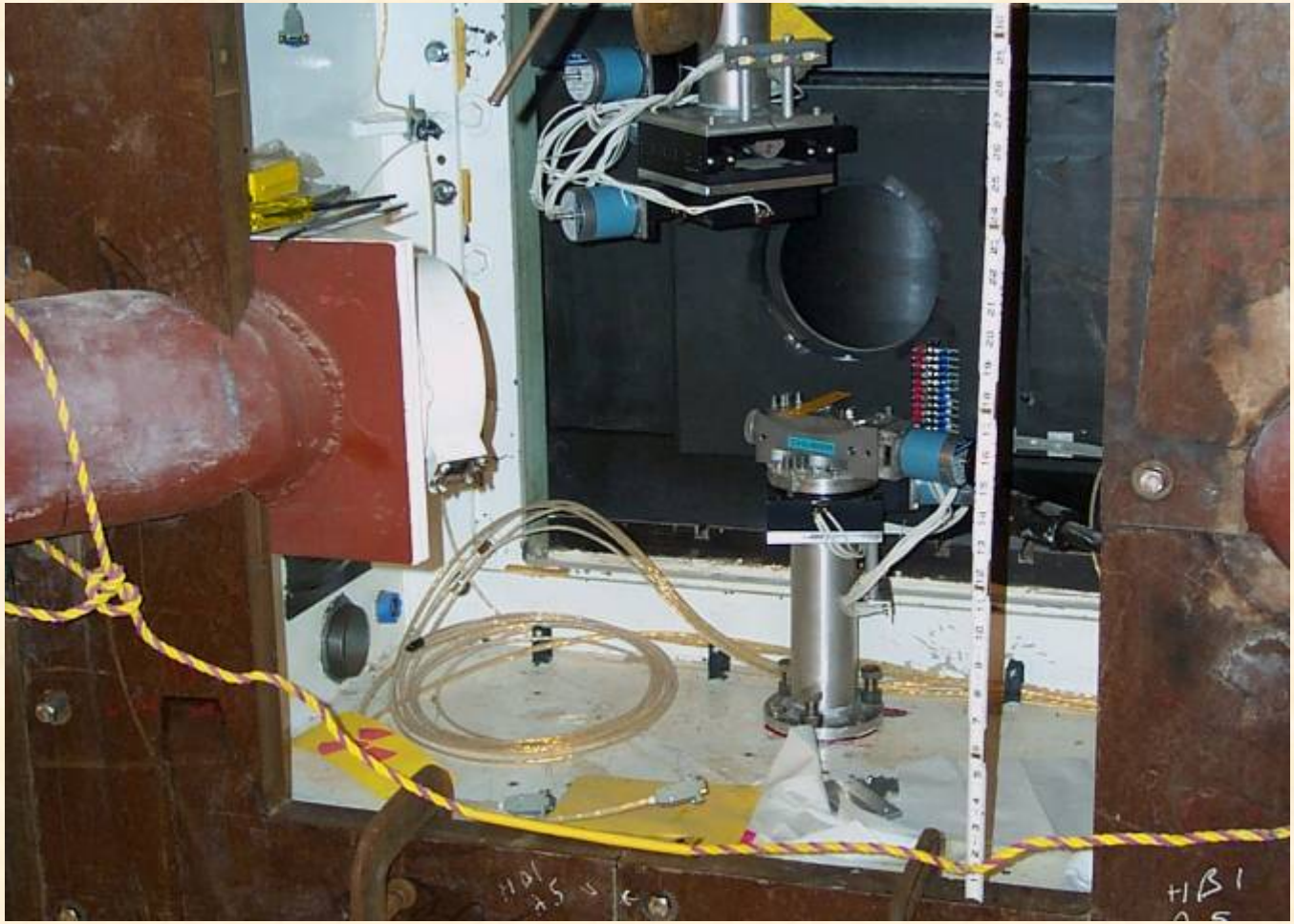
HB-1

Our Installed Instruments

HB-1A

Our Installed Instruments

HB-1A



Our Installed Instruments
HB-1A 2nd Monochromator Shield

Our Installed Instruments

HB-1A

Our Installed Instruments

HB-1A

Our Installed Instruments
SANS 1 and 2

Our Installed Instruments
SANS 2 Vacuum Tank at Fabricators

Our Installed Instruments
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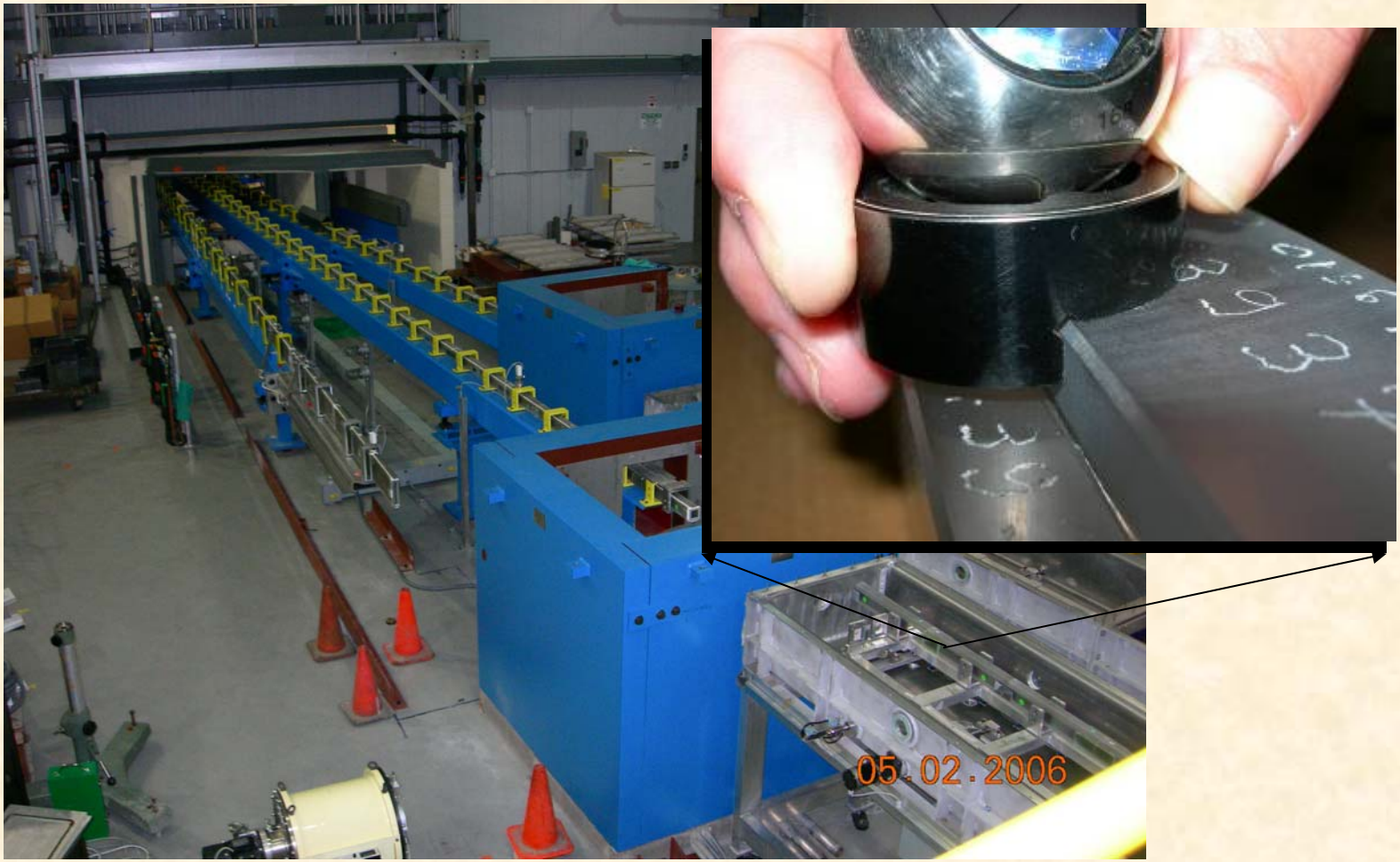
SANS 2 Vacuum Tank at Fabricators

Our Installed Instruments
Preparing to receive SANS 2 Vacuum Tank

Our Installed Instruments
SANS 1 and 2

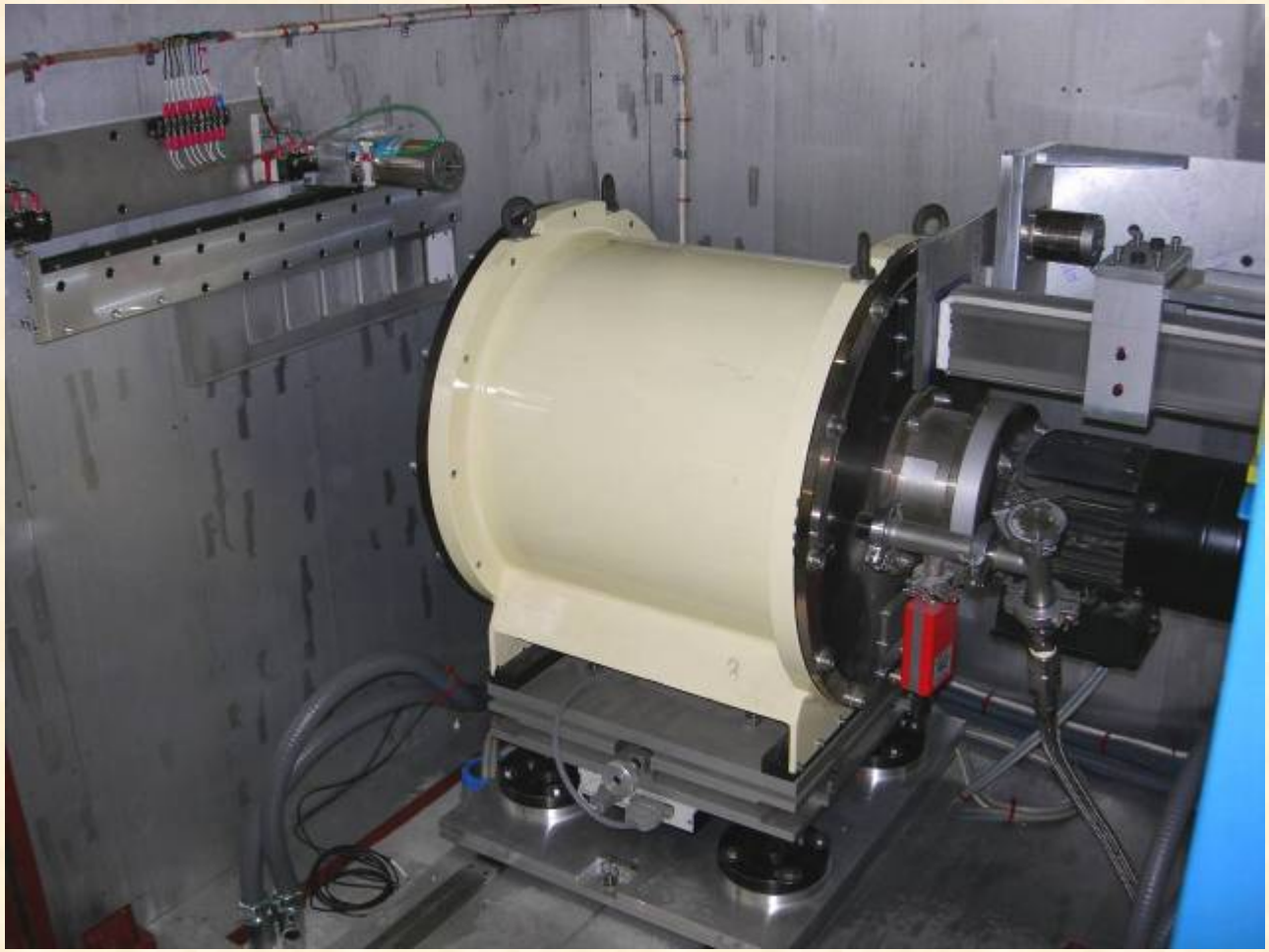
Our Installed Instruments
Neutron Guides

Our Installed Instruments
Neutron Guides



Not Only Large Instrument Components

Velocity Selector – Shutter - Attenuator



Economic and Schedule Benefits

This methodology of installation has not only proven extremely effective from an operational perspective, but also has provided very positive schedule and budgetary benefits.

Schedule Benefit

We are often able to fast track activities that would normally have to be performed sequentially.

Economic Benefit

Significant direct cost savings from this strategy are realized by our ability to relax tolerances for both engineering *and* fabrication.

½ = $
0.0 = $$
0.00 = $$$
0.000 = $$$$

Summarization

- **Why Create a Coordinate System**
  - Installation to coordinates instead of existing surfaces.
  - Increased accuracy of instruments.
- **Developing the Coordinate System**
  - Reproducibility is critical.
  - Confidence is vital.
- **Some of our Installed Instruments**
  - Installation of components previously unavailable using old technology.
  - Schedule friendly.
- **Economic and Schedule Benefit**
  - Ability to Fast Track installations.
  - Relax tolerances for Engineering and Fabrication.

Questions?