

Neutrons and more The look ahead

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Spallation Neutron Source
Oak Ridge National Laboratory

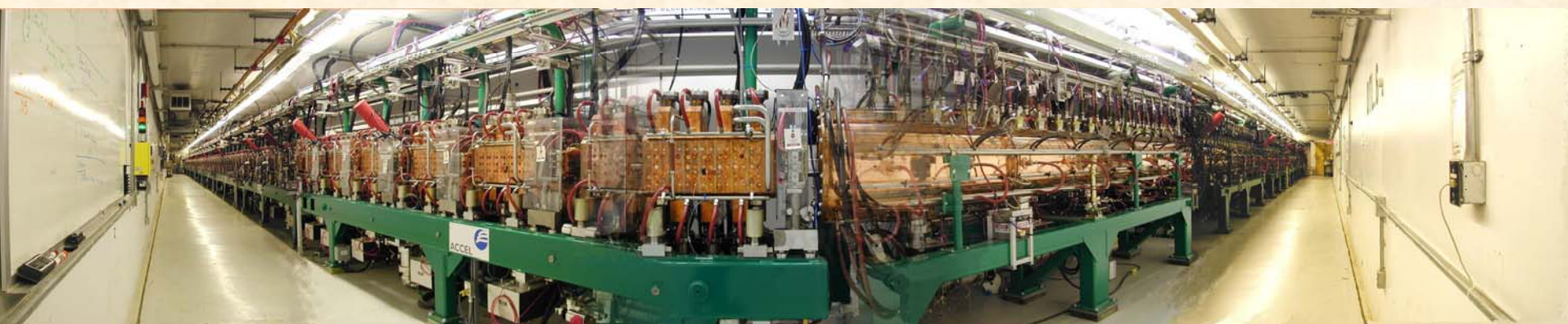
October 11, 2005

The Spallation Neutron Source

- The SNS will begin operation in 2006
- At 1.4 MW it will be the world's leading pulsed spallation source
- The peak neutron flux will be ~20–100x ILL
- SNS will be the world's leading facility for neutron scattering
- It will be a short drive from HFIR, a reactor source with a flux comparable to the ILL



Linear Accelerator



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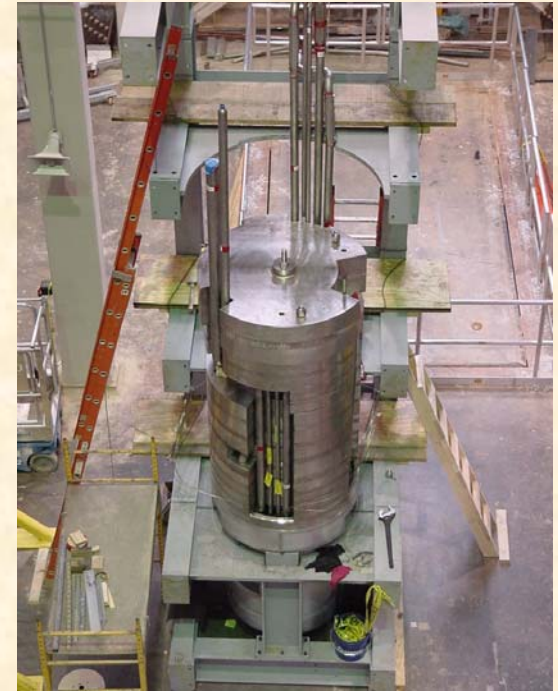
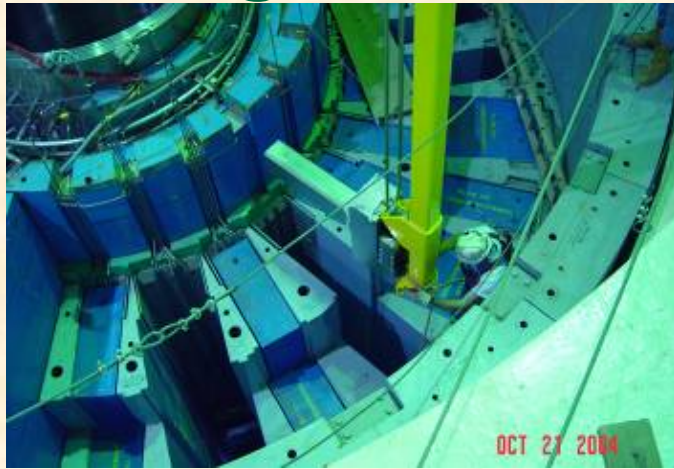
Why are we here?



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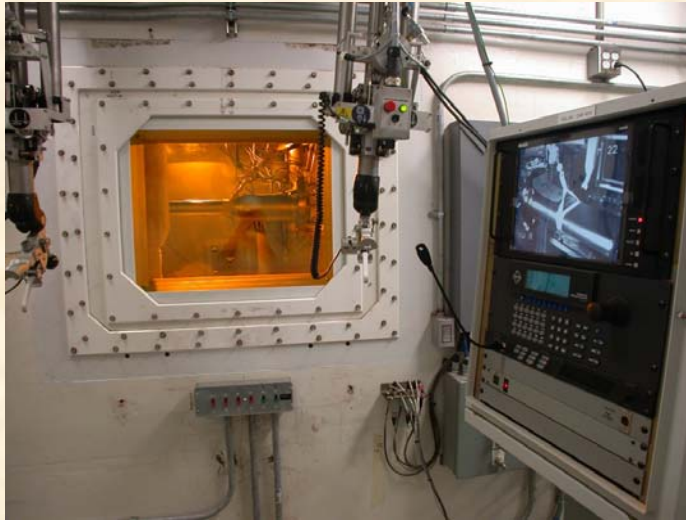
Target installation



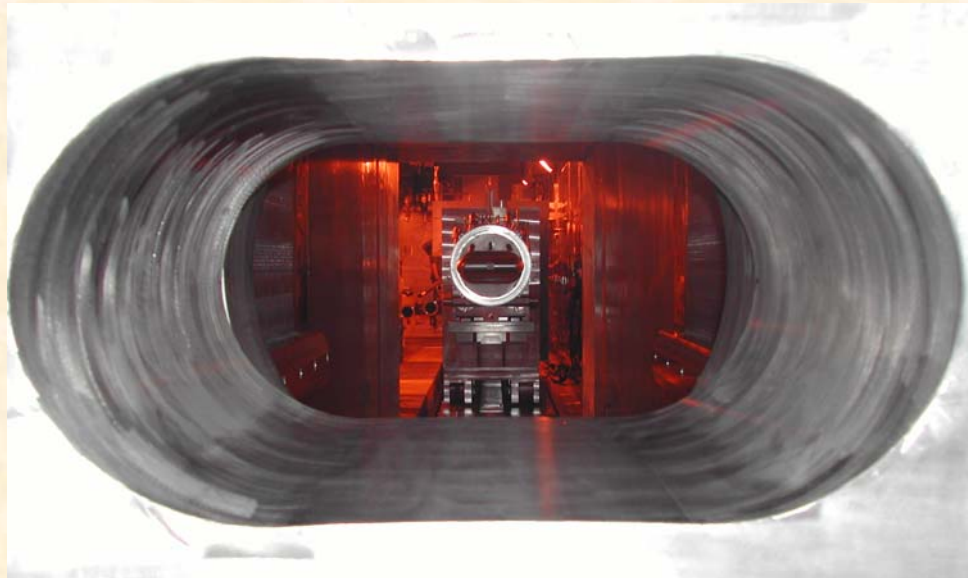
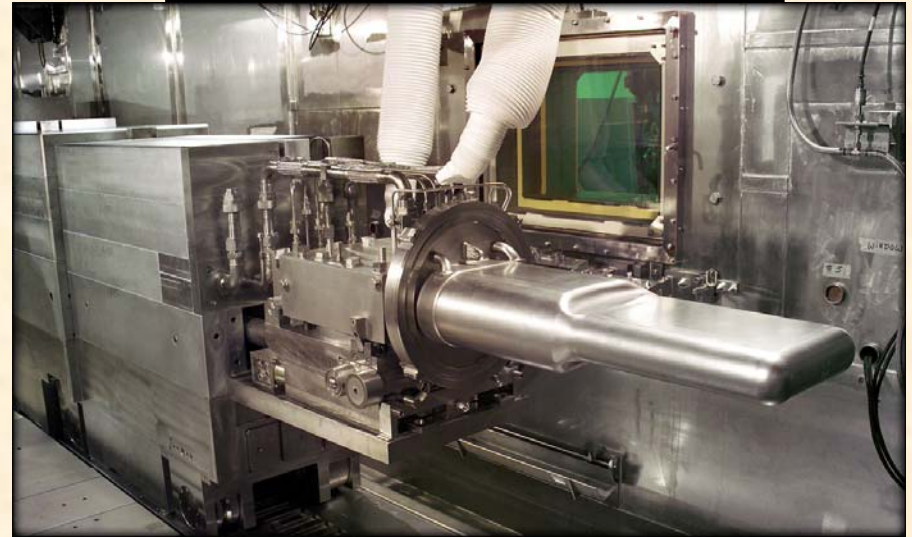
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Mercury Target



Target installed on Carriage



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Remote Handling



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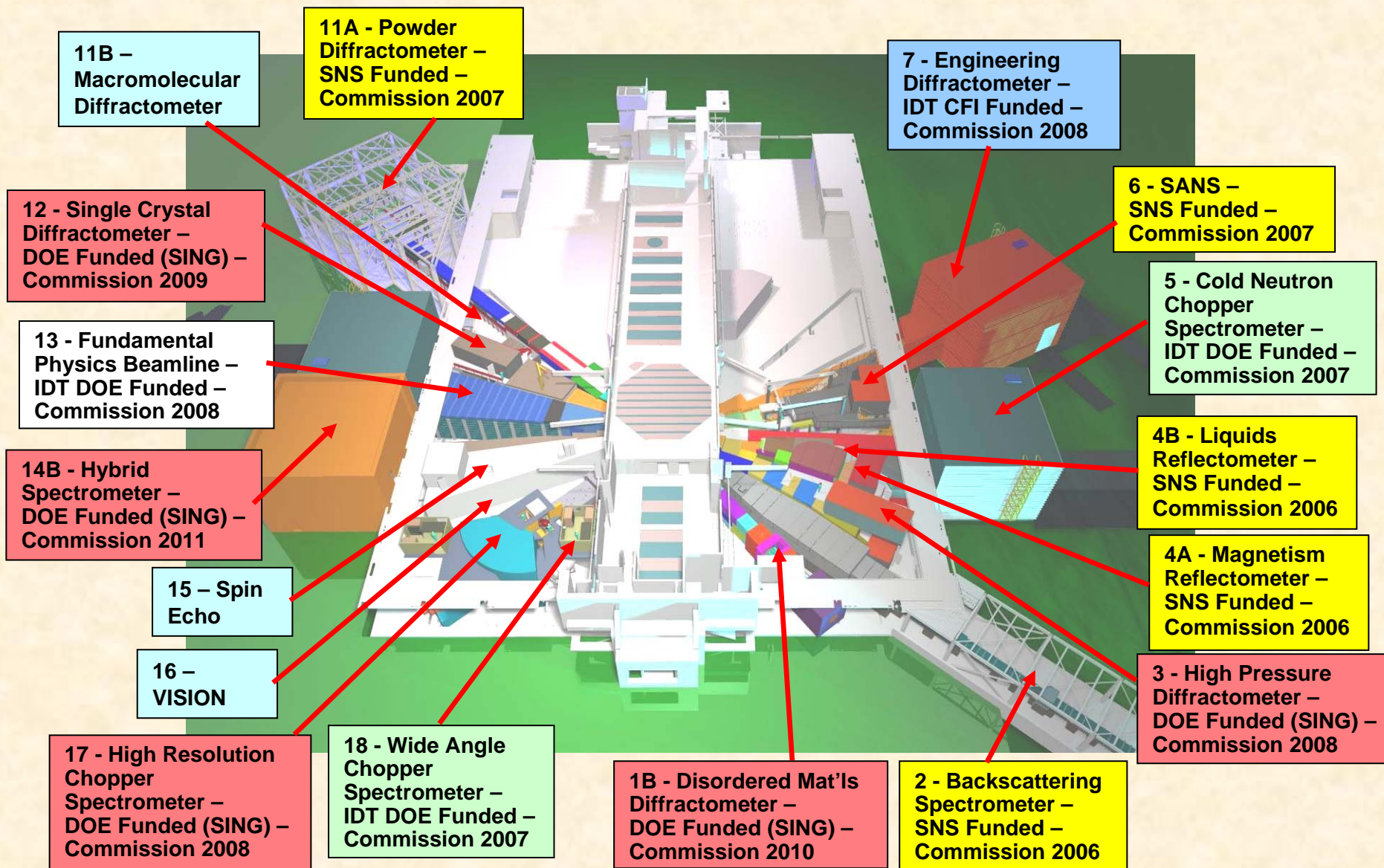
You can teach the robots anything....



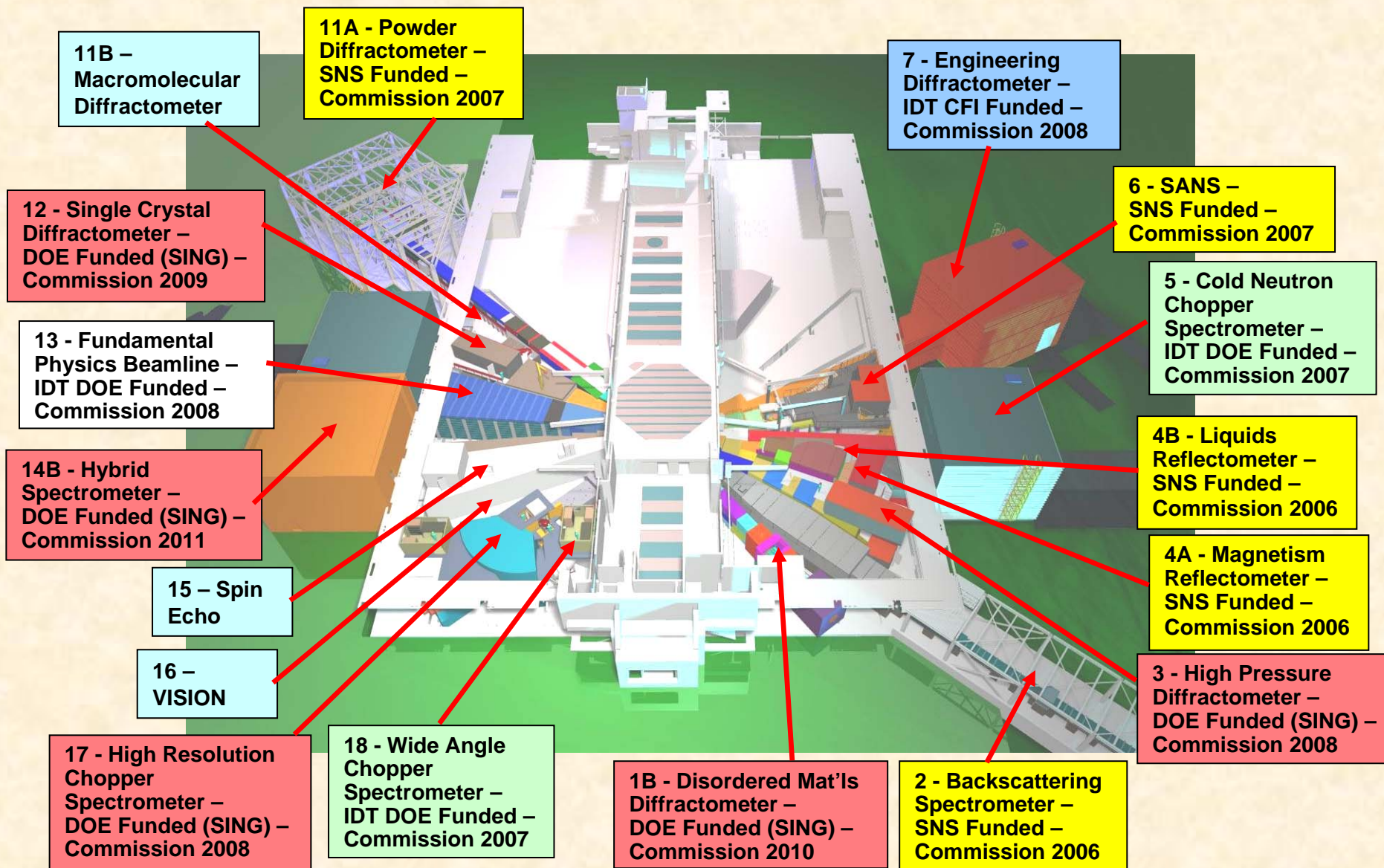
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The logo for UT-Battelle, featuring a stylized green mountain range above the text "UT-BATTELLE" in a bold, black, sans-serif font.

17 Approved Instruments and more to come

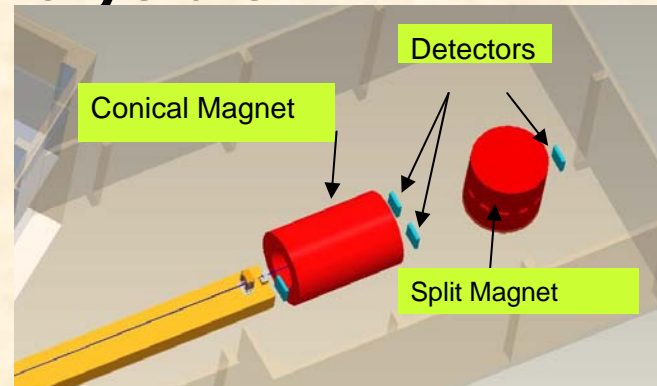


Time line for commissioning

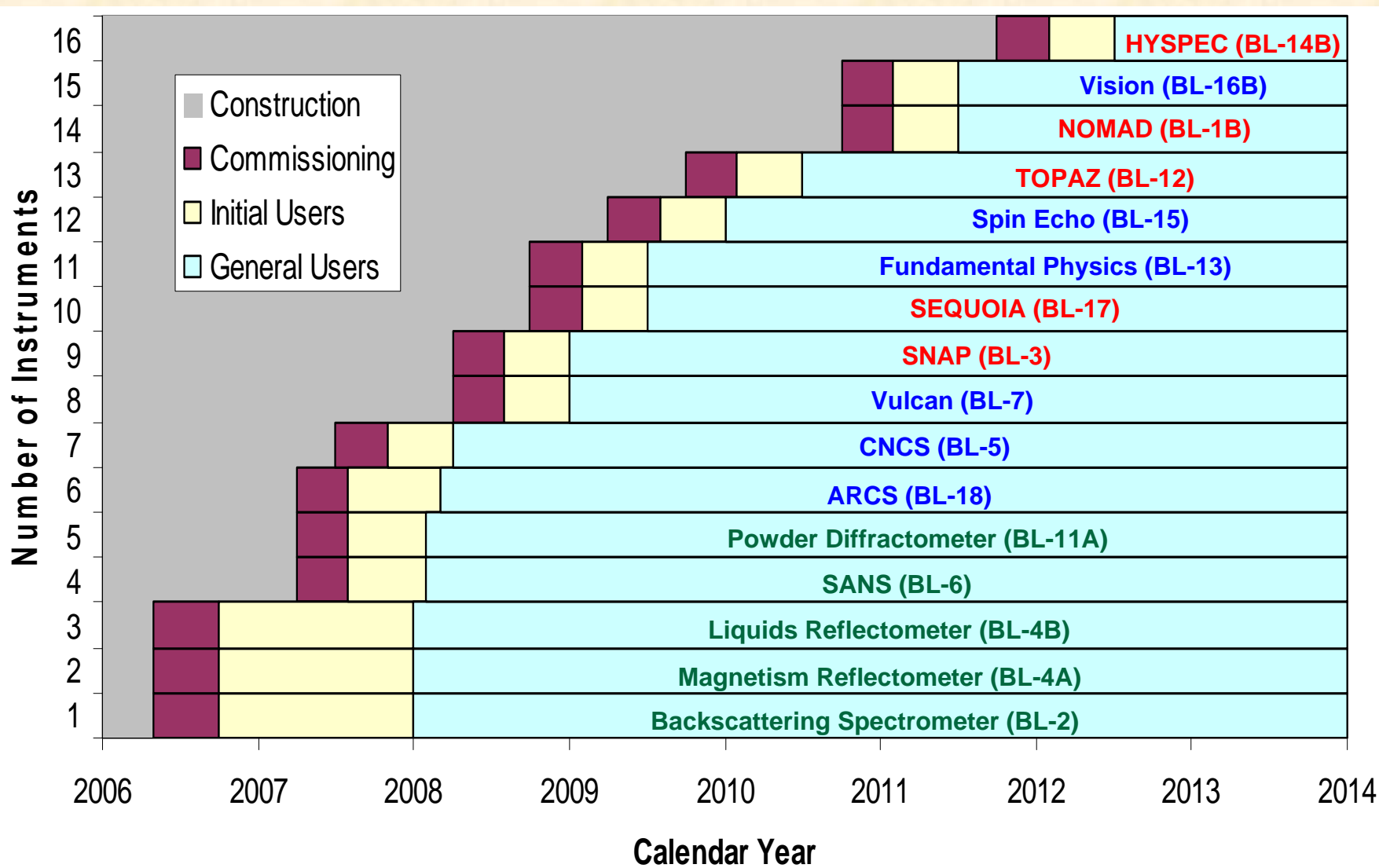


Other instruments under development

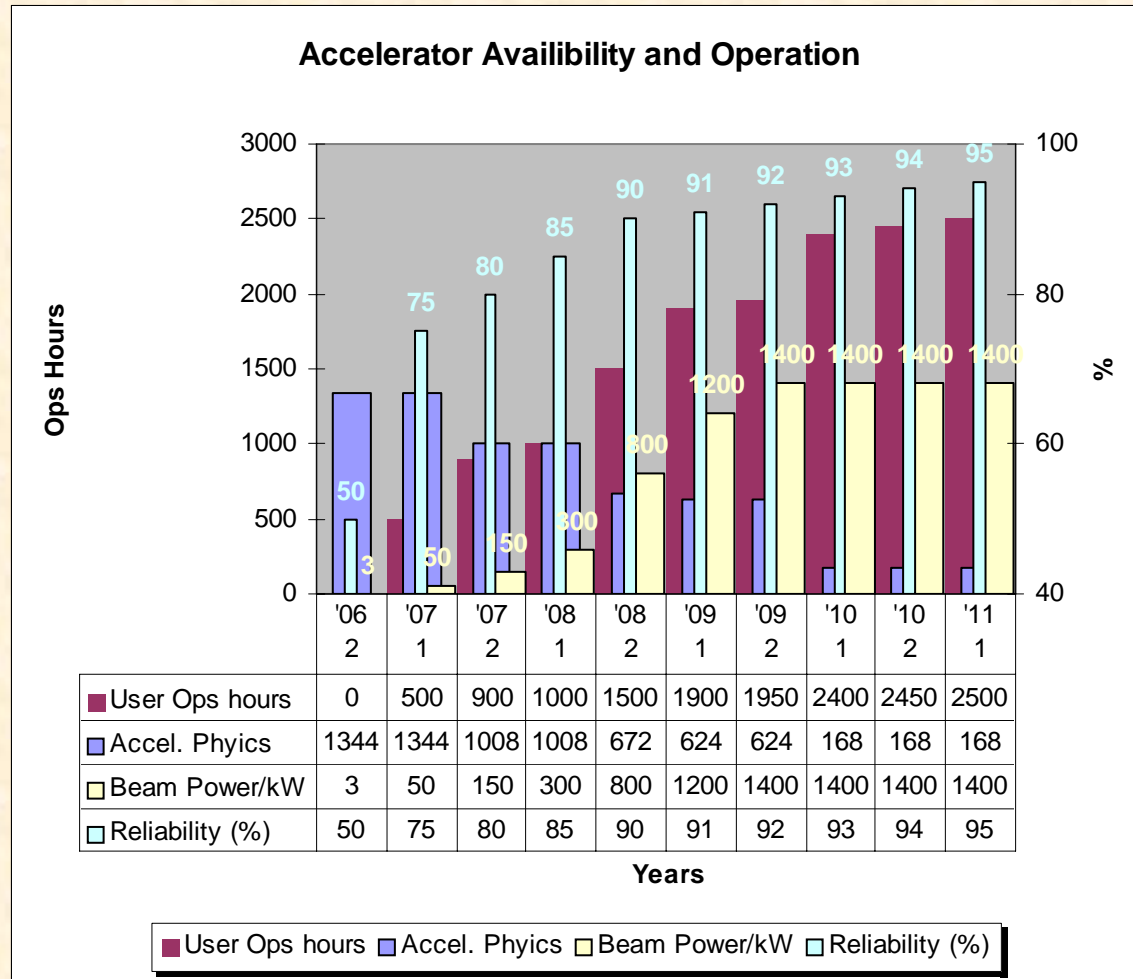
- **Micro SANS**
 - $Q \sim 2 \cdot 10^{-6} \text{ \AA}^{-1}$
- **Corelli**
 - diffuse scattering from single crystals
- **High Field Magnet**
 - Dedicated 40T instrument
- **SESAME**
 - spin echo angle labeling techniques
- **Imaging**
 - Tomography, Holography, Phase contrast



Schedule for Funded Instruments



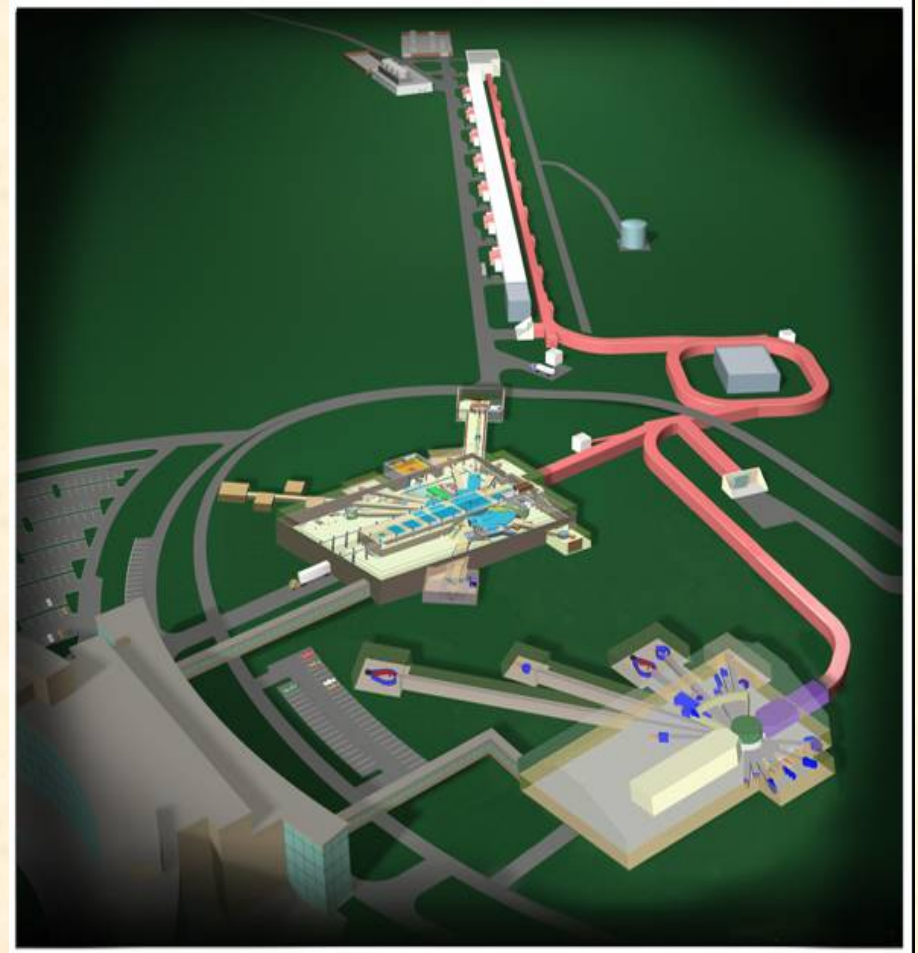
SNS Early Operations: Reliability is the goal



SNS 20-Year Plan

The SNS is designed to allow operations with two target stations

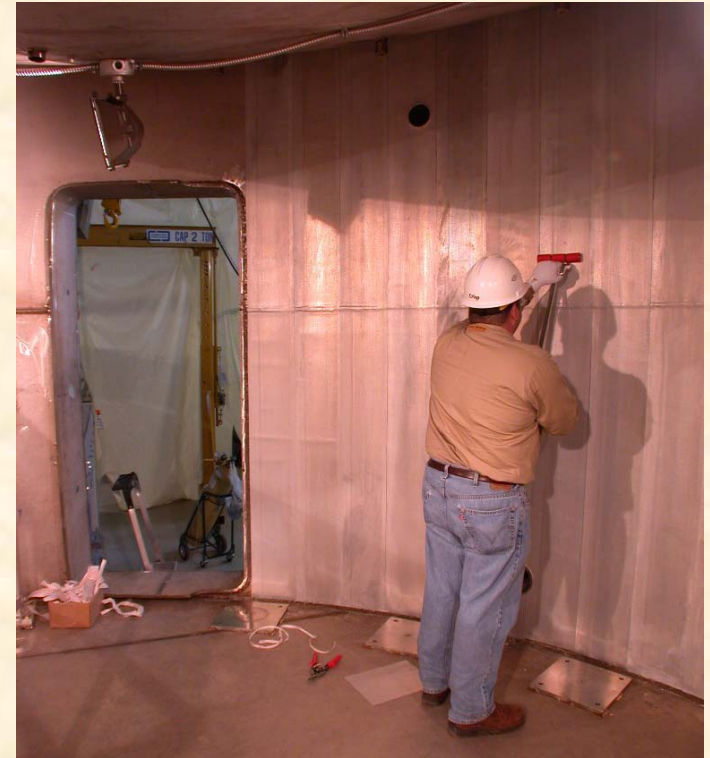
- **Phase 1 – Power Upgrade**
 - 3-4 MW
 - Completion FY10
- **Phase 2 - Long Wavelength Target Station (LWTS)**
 - 22 Instruments
 - 440 – 880 kW
 - 20 Hz
 - Completion FY13



Backscattering - Ken's pride and joy!



More backscattering



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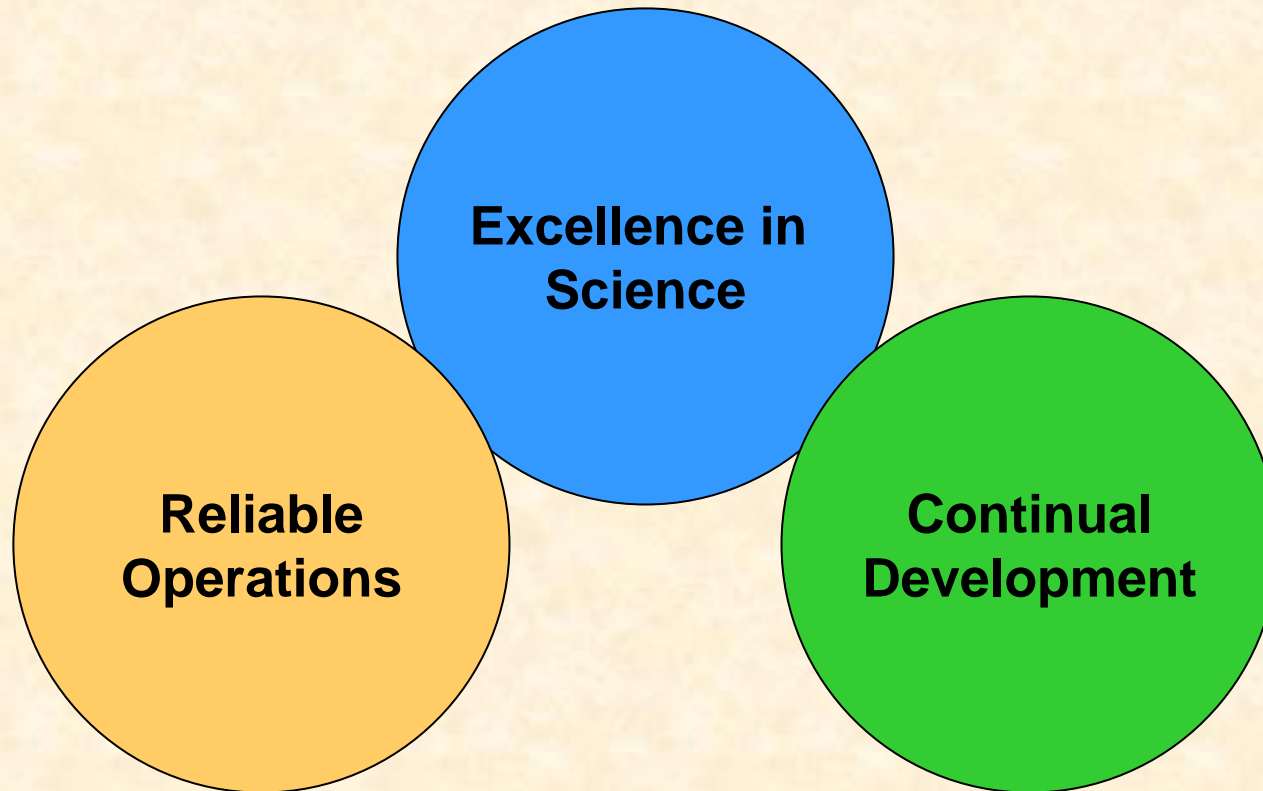
Reflectometers (Frank and John)



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What are our goals?



ORNL has a lot to offer....

- **Neutron Scattering**

- **HFIR**
- **SNS**
- **Joint Institute for Neutron Scattering**



- **Centre for Nanophase Materials Sciences**



- **Computational Resources**

- **Center for Computational Sciences,**
- **National Leadership Computing Facility**



- **Electron Microscopy**

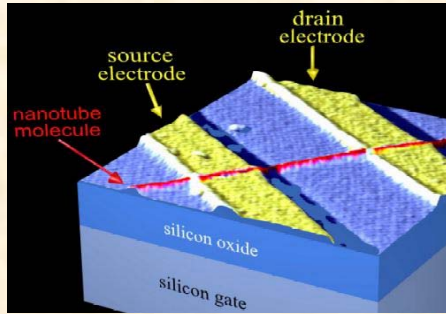
- **Shared Research Equipment (SHaRE) User Program**
- **High Temperature Materials Laboratory**
- **Condensed Matter Sciences Division electron microscopy program**



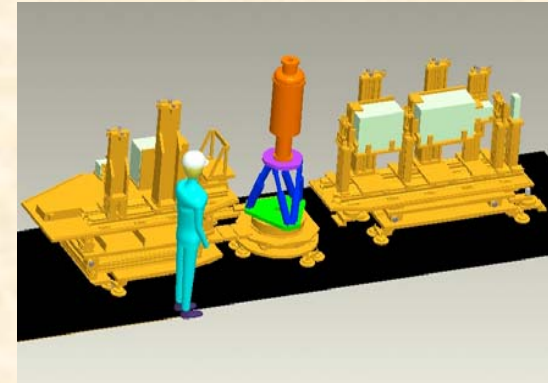
Users can expect...

- **“One Stop Shopping” - Combined Proposals**
 - HFIR, SNS, CNMS, (Computing)
- **Full support for experiments**
 - Instrument operations, Sample Environment, etc.
- **Data Treatment and Analysis Software**
 - Remote access, data sharing, archiving
- **A friendly welcome**

Efficient use of facilities

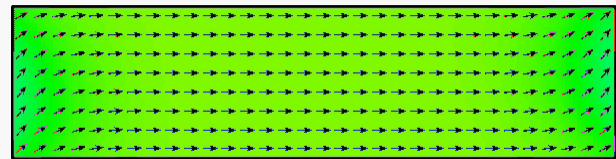
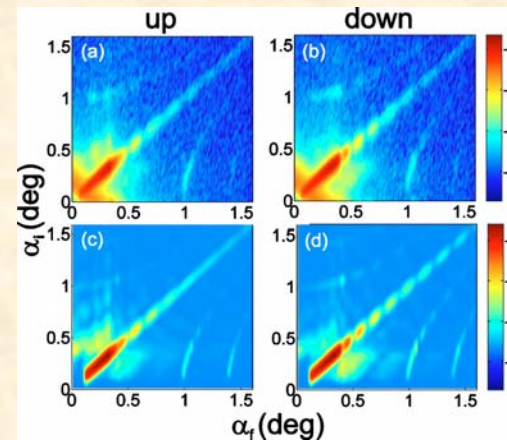


Synthesis



Characterization & Data Analysis

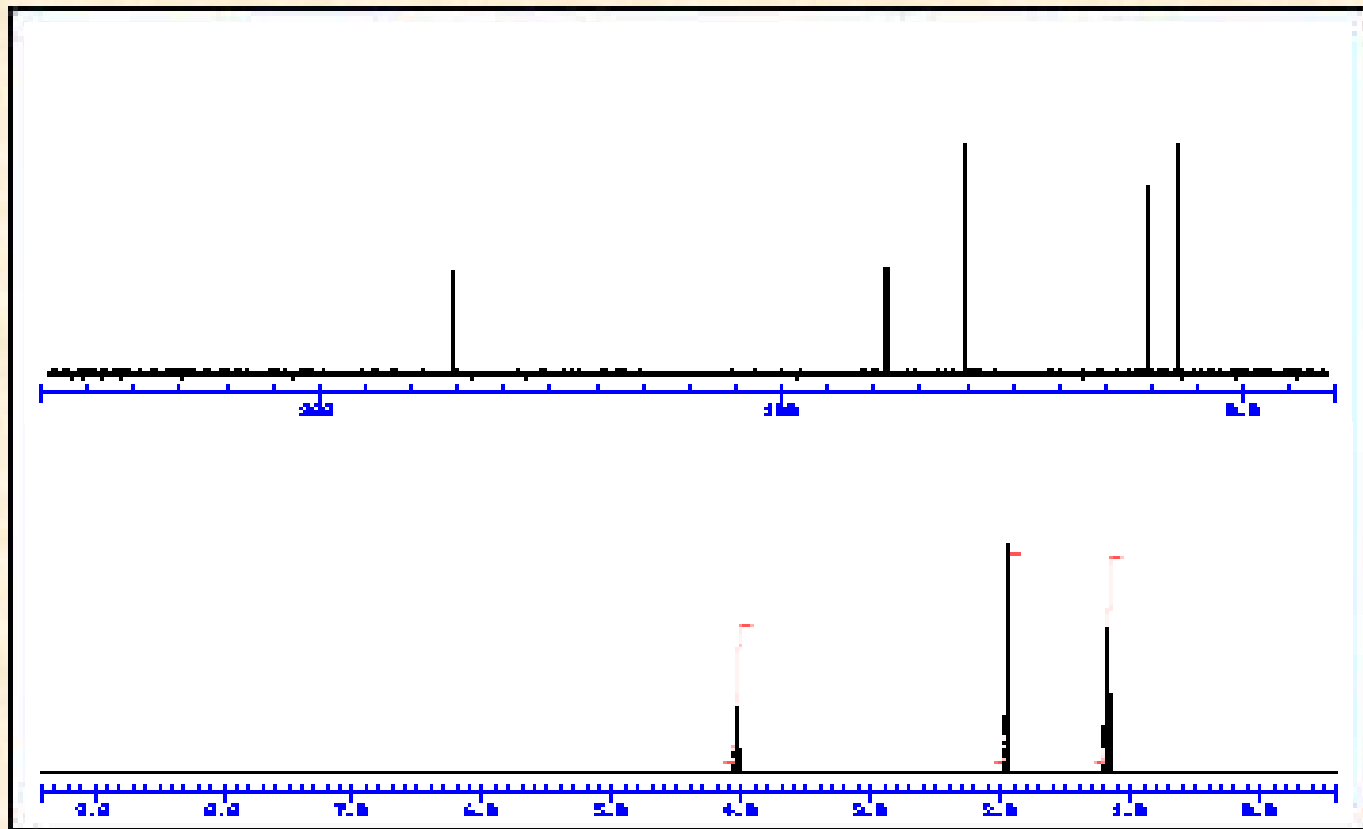
$t_{\text{analysis}} < t_{\text{experiment}}$



**Theory, Modeling,
and Simulation**

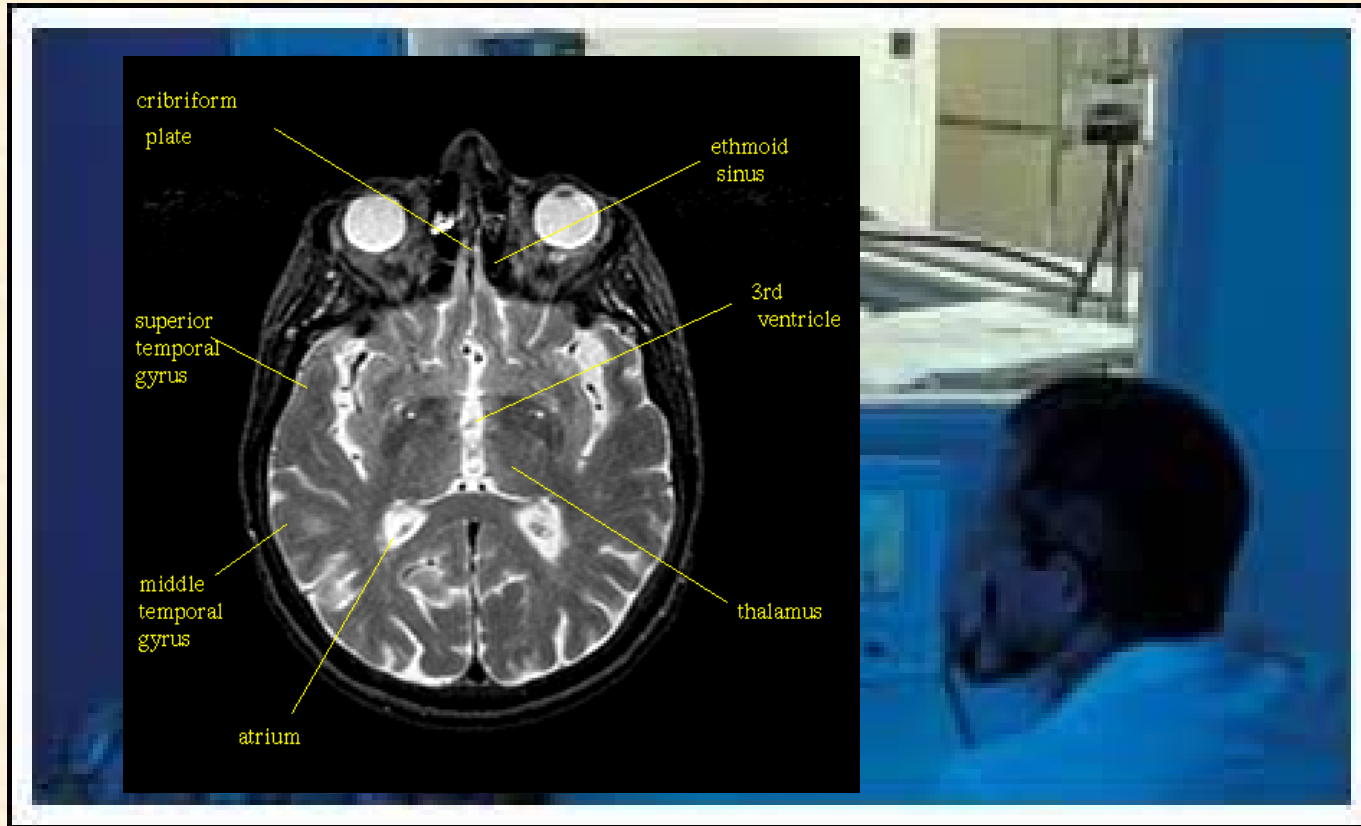
Are we completing the cycle?

Take an example from the medical community...



Give users what they want...

Automation and intelligent control



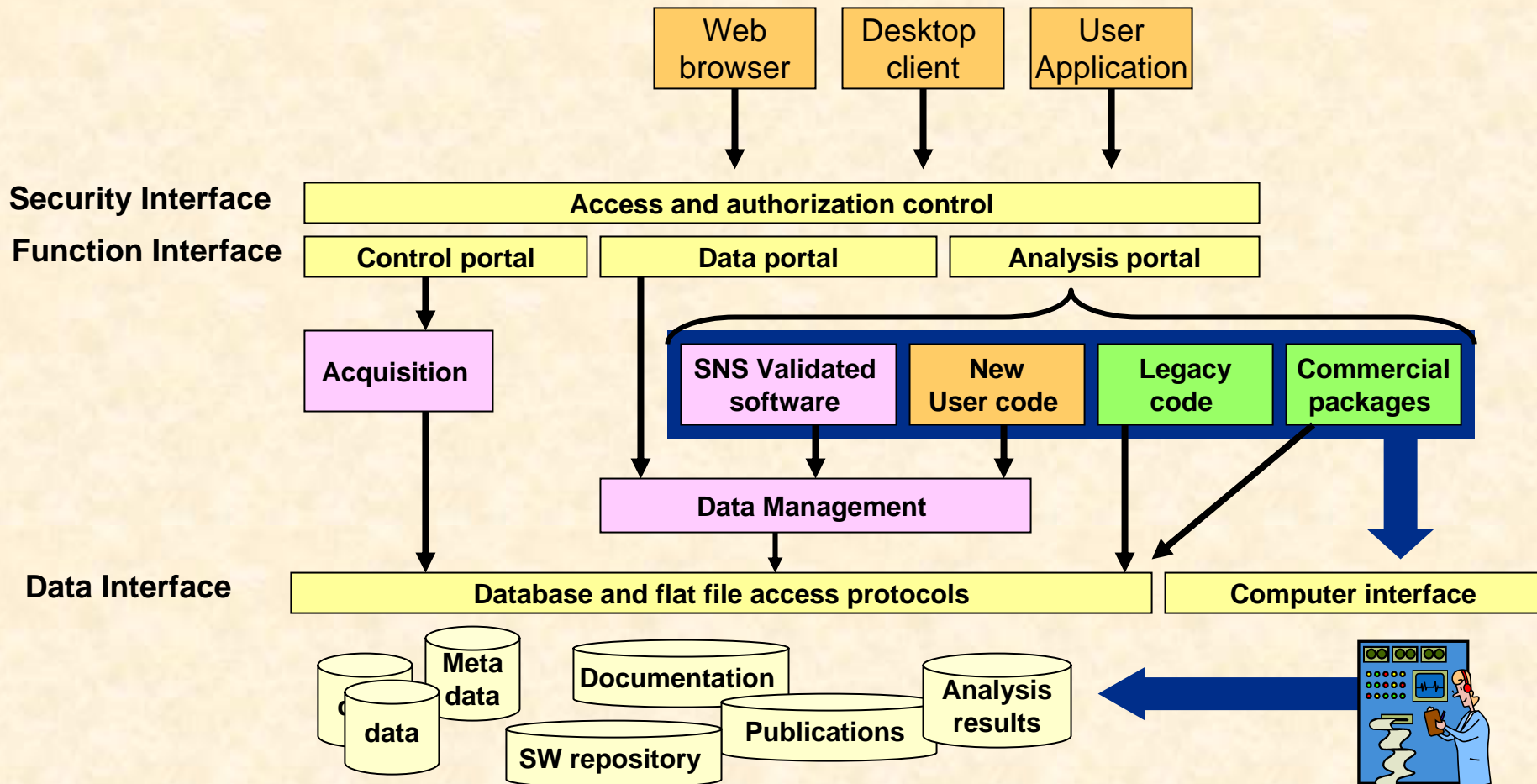
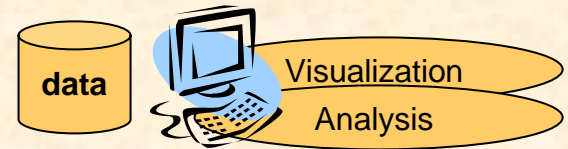
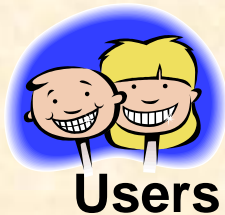
Sensible Data Management...

...requires:

- **Rapid data analysis for intelligent control**
- **Sharing of data from different facilities**
- **Rapid Data access**
- **Standard formats**
- **Curation of data and meta data**
- **A structured data management environment**

...and enables efficient use of neutrons

A structured data management



Interactions with Users

Join in the Instrument Meetings

- **Communication**

Fill in the questionnaire

- The Neutron Pulse
- Monthly Construction Updates
- Instrument Newsletters
- SHUG

- **Instrument Teams**

- Science development
- Instrument upgrades and development
- Sample Environment, Software

- **Outreach**

- Workshops
- Seminars