SNS: Recent Progress & Transition to Operations

Presented to:
SNS & HFIR Users Group

by
T. E. Mason
Associate Director for the SNS
Oak Ridge National Laboratory

October 2005
Oak Ridge

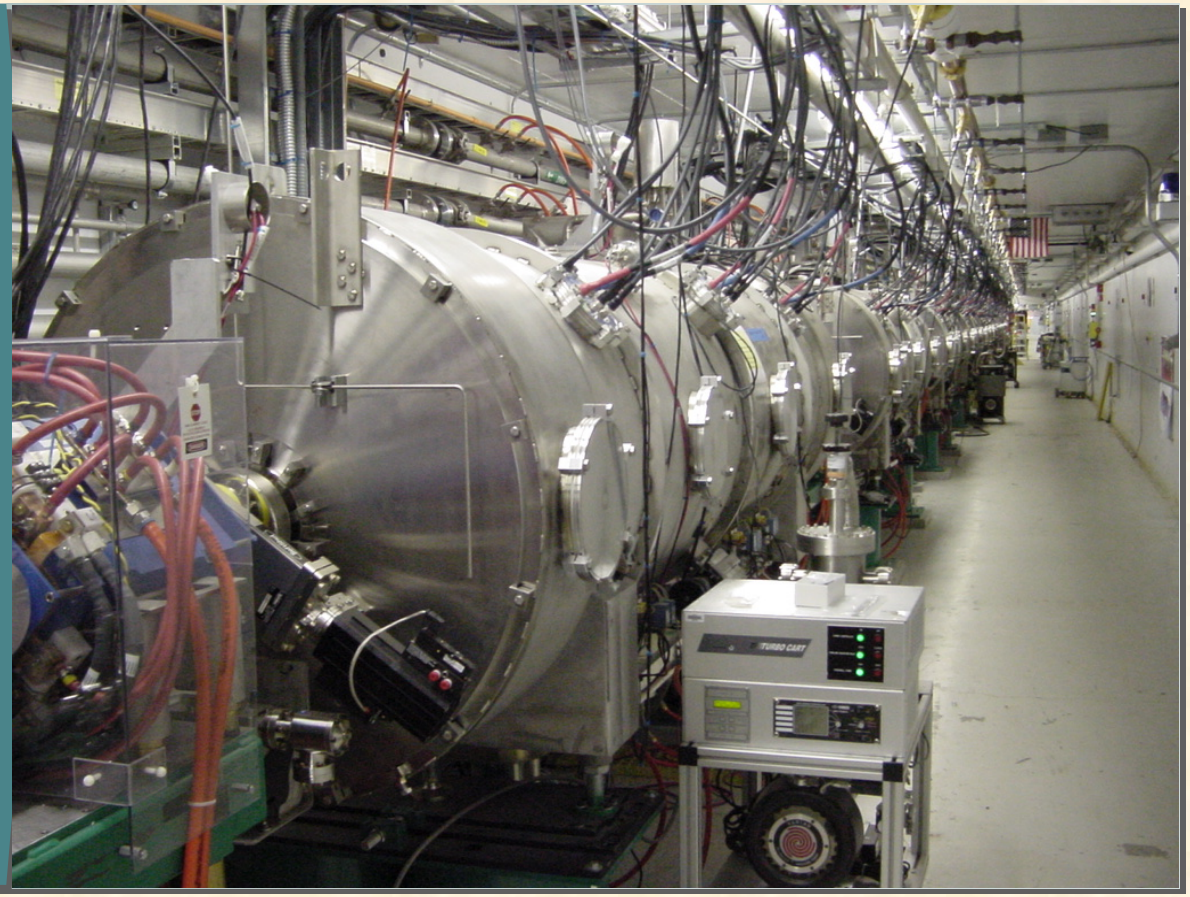
The Spallation Neutron Source

- The SNS will begin operation in 2006
- At 1.4 MW it will be ~8x ISIS, 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

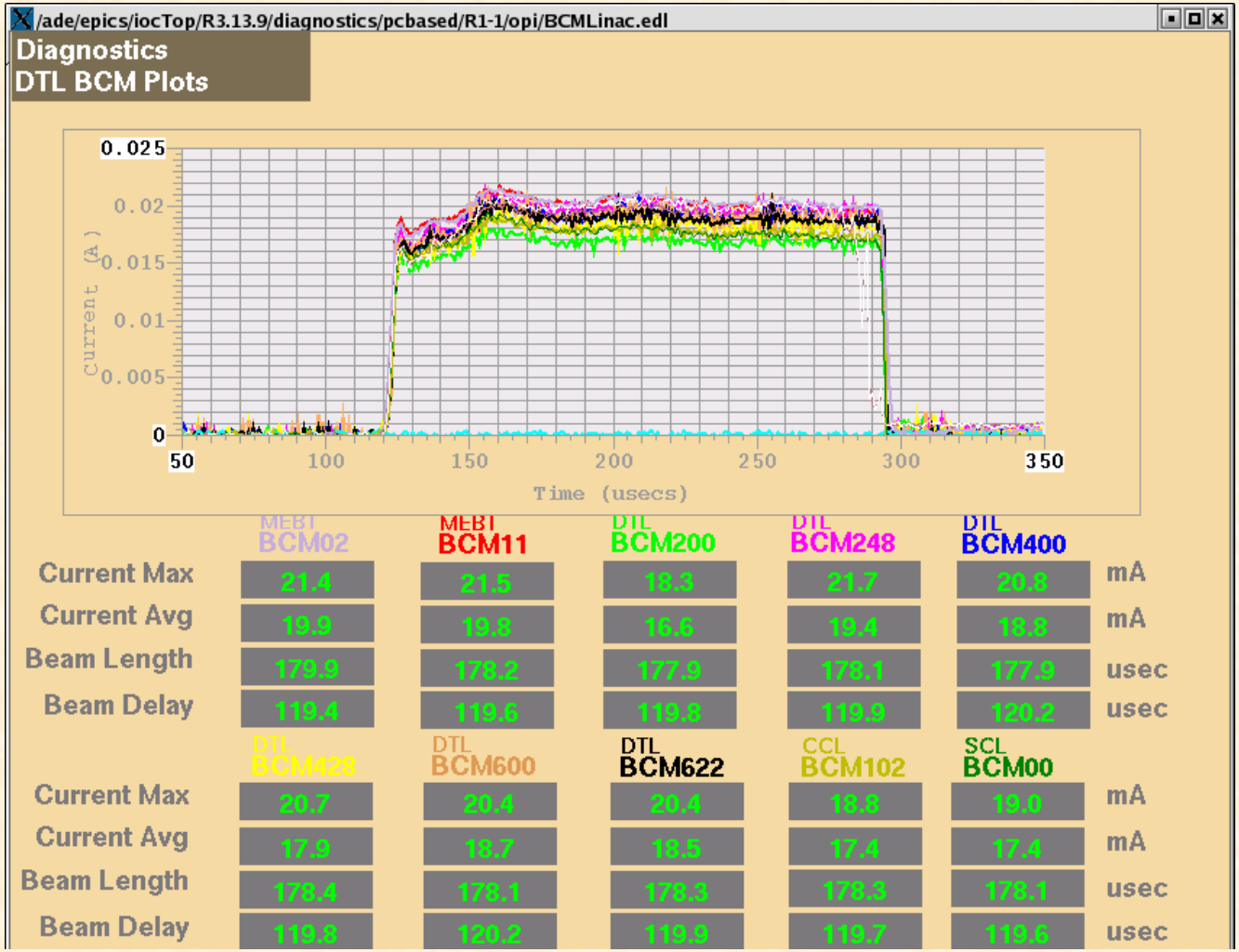
Superconducting Linear Accelerator

Progress

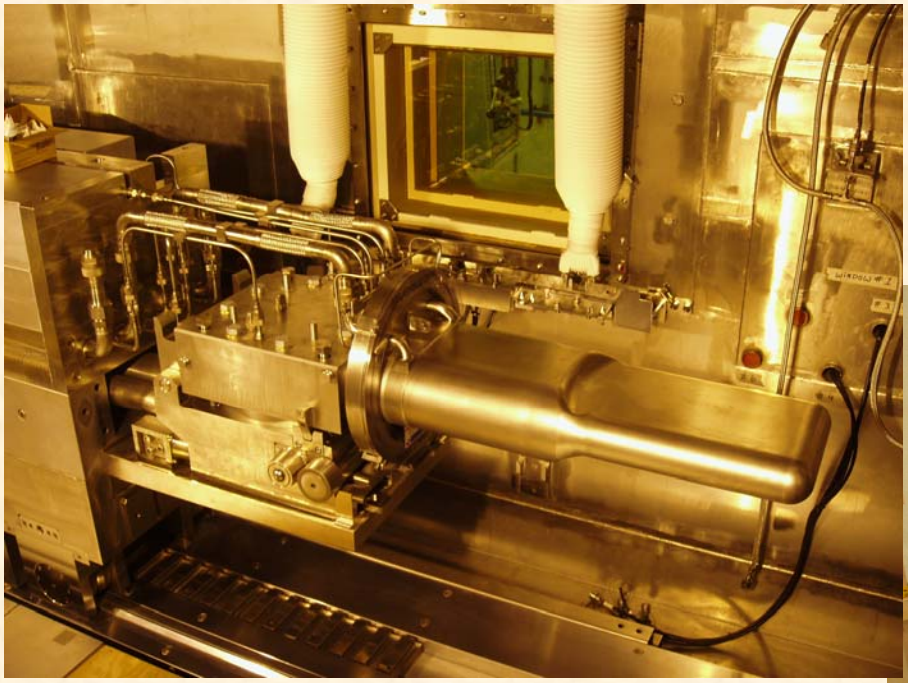
- Cryoplant commissioned
- Installation complete
- System testing underway
- 76 cavities operated simultaneously
- Average gradient exceeds spec (~20 MV/m)
- Commissioned August 05, world's highest energy proton linac!



Superconducting Linear Accelerator - Commissioning



Experimental Facilities Installation

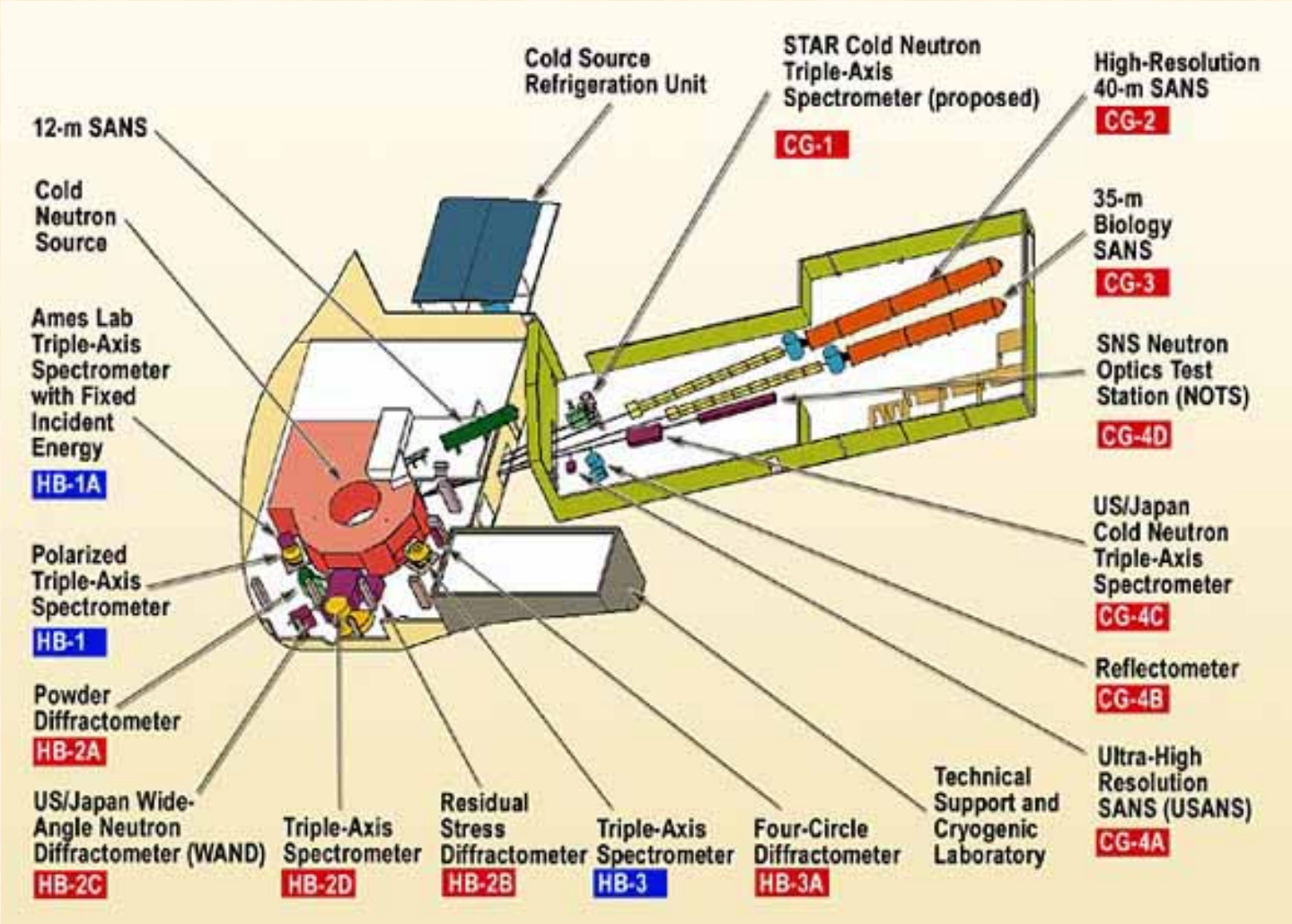


Target module

Neutron guide

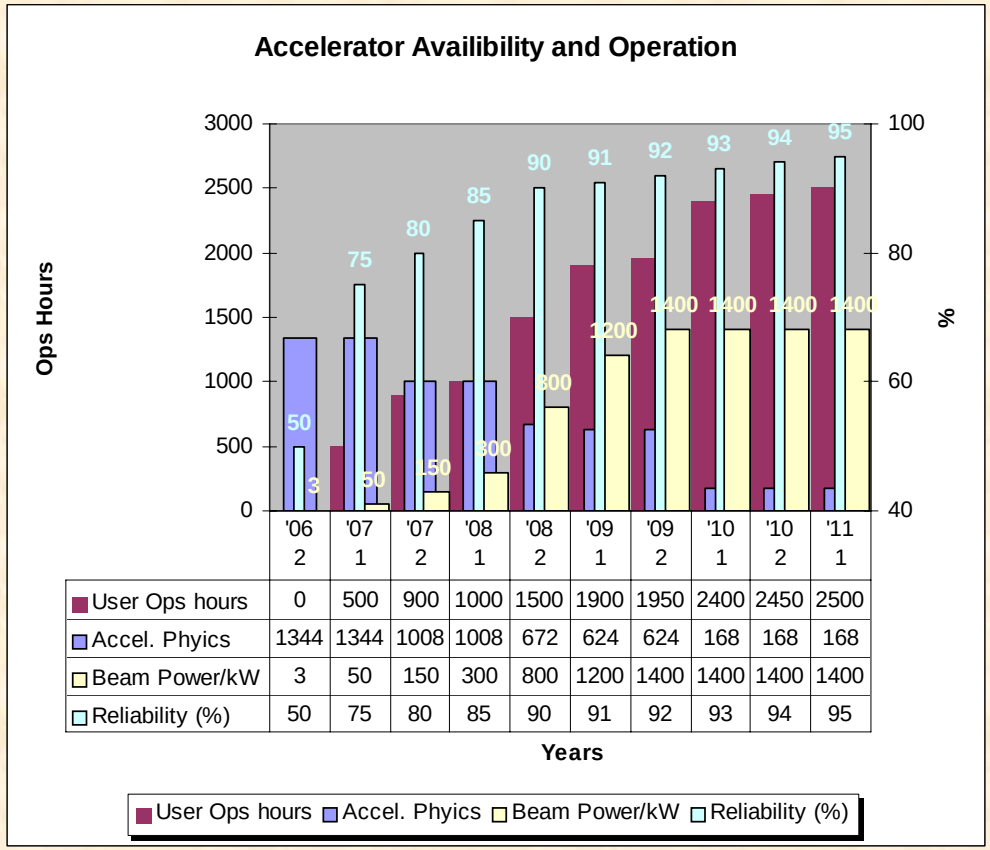
Seventeen instruments now formally approved for SNS

HFIR


Cold Source Refrigeration Unit
STAR Cold Neutron Triple-Axis Spectrometer (proposed)
CG-1
High-Resolution 40-m SANS
CG-2
12-m SANS
Cold Neutron Source
35-m Biology SANS
CG-3
Ames Lab Triple-Axis Spectrometer with Fixed Incident Energy
HB-1A
SNS Neutron Optics Test Station (NOTS)
CG-4D
US/Japan Cold Neutron Triple-Axis Spectrometer
CG-4C
Polarized Triple-Axis Spectrometer
HB-1
Reflectometer
CG-4B
Powder Diffractometer
HB-2A
Ultra-High Resolution SANS (USANS)
CG-4A
Technical Support and Cryogenic Laboratory
US/Japan Wide-Angle Neutron Diffractometer (WAND)
HB-2C
Triple-Axis Spectrometer
HB-2D
Residual Stress Diffractometer
HB-2B
Triple-Axis Spectrometer
HB-3
Four-Circle Diffractometer
HB-3A

SNS Early Operations: Ramping up Scientific Productivity

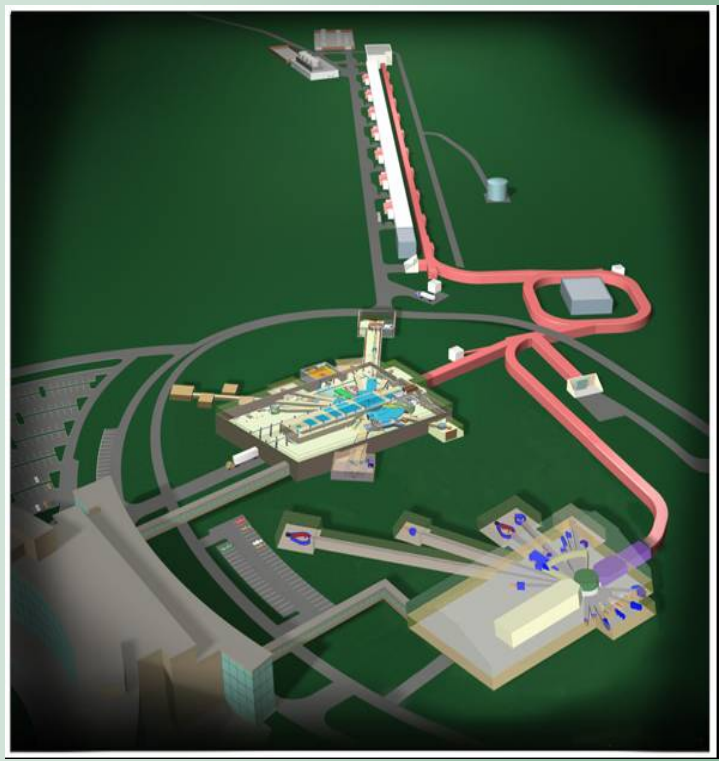
- Timeline for a new instrument is ~5 years
- Beamlines at SNS will be fully committed in ~2-3 years
- Only one coupled-cold moderator beamline is left
- Without a dedicated beamline SNS will be limited to <~15 T



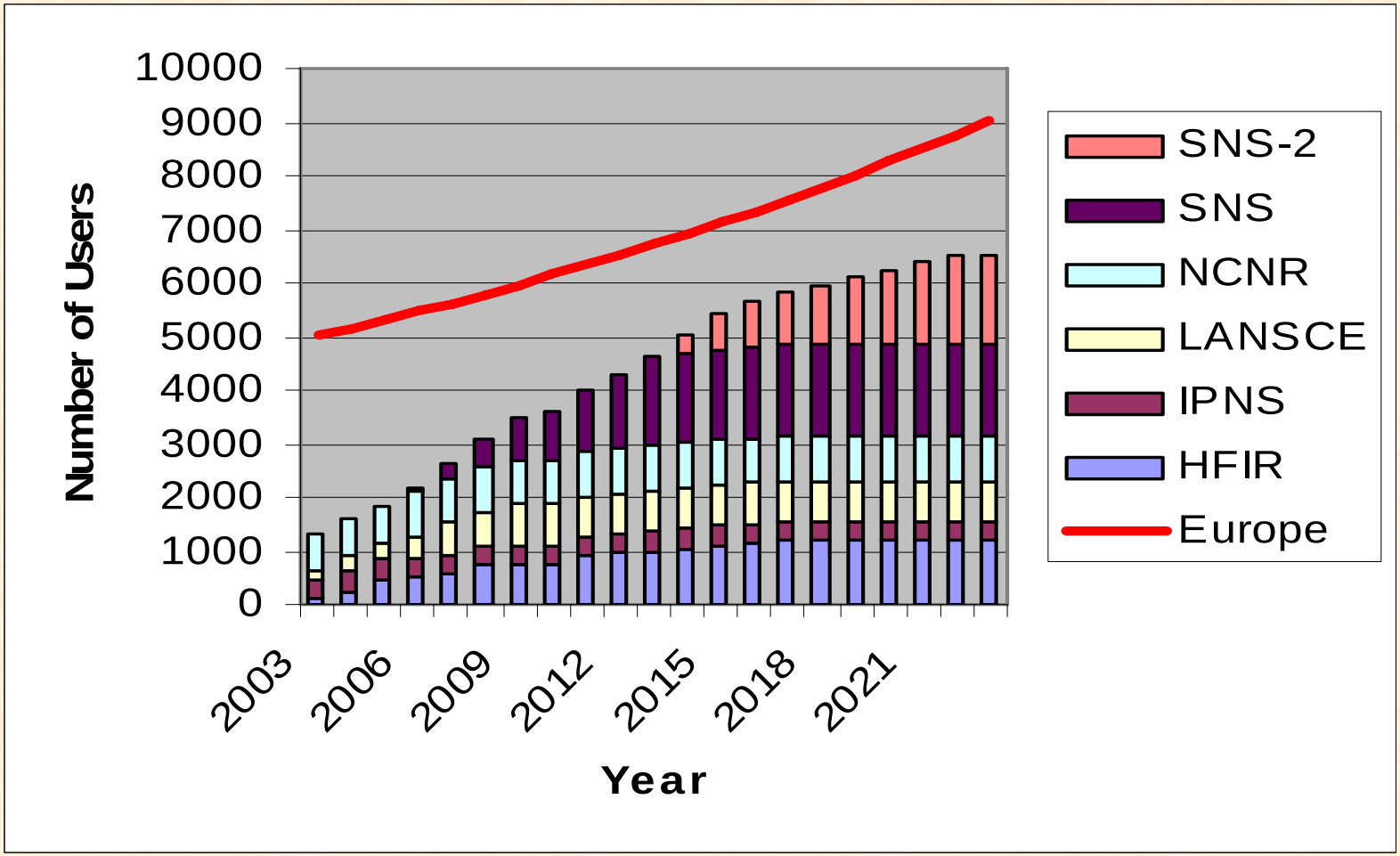
	'06 2	'07 1	'07 2	'08 1	'08 2	'09 1	'09 2	'10 1	'10 2	'11 1
User Ops hours	0	500	900	1000	1500	1900	1950	2400	2450	2500
Accel. Phyics	1344	1344	1008	1008	672	624	624	168	168	168
Beam Power/kW	3	50	150	300	800	1200	1400	1400	1400	1400
Reliability (%)	50	75	80	85	90	91	92	93	94	95

SNS 20-year plan

- **SNS will evolve along the path envisaged in the Russell Panel specifications**
- **In twenty years it should be operating ~45 best-in-class instruments with two differently optimized target stations and a beam power in the 3-4 MW range**
- **The Power Upgrade and Long Wavelength Target Station should follow a sequence that meshes with deployment of the initial capability and national needs**



Neutron Scattering 20 Year Outlook



Near Term:

- **Scientific Commissioning phase of SNS and new instruments at HFIR offers special opportunity**
  - **Need to bring in people with good ideas that are well matched to early capabilities**
  - **Should include some experienced neutron experimentalists on the teams**
  - **Must have flexibility in scheduling (proximity will help at this stage)**
  - **Should we consider some glue (travel money for students and post-docs could go a long way at little expense)**
- **Goal is for both SNS and HFIR to operate seamlessly from the User point of view**