SNS Project Status

Dave Thompson (Presenter)

Dave Gurd and a host of SNS Staff

The Spallation Neutron Source

- The SNS construction project will conclude in 2006

- At 1.4 MW it will be ~8x ISIS, the world's leading pulsed spallation source

- An upgrade to 3MW has been approved for CD0 planning.

Instruments

- 17 instruments approved – more in the pipeline

  - MANDI (protein crystallography) approved

  - CD2 for Fundamental Physics Beamline

  - CD-3A SING completed

  - DOE reviews of university-led IDT beamlines completed

  - Design wrapping up and
    installation underway for 5
    project funded instruments

- International
  engagement and interest
  in the instrument suite

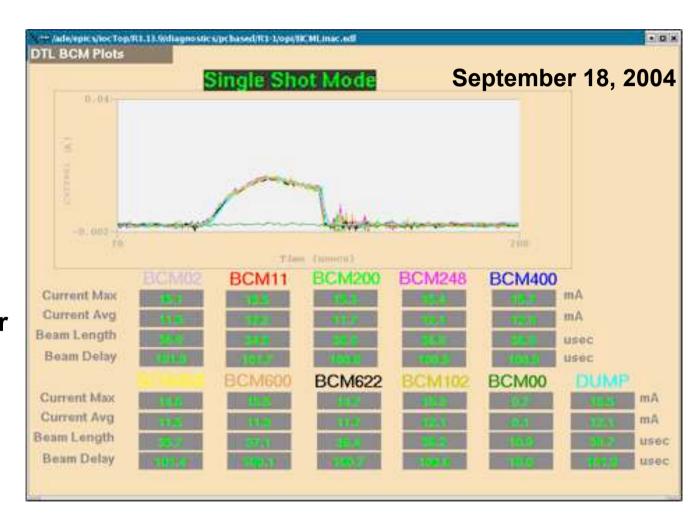- Continuing engagement
  with scientific community

DTL / CCL 1-3 Commissioning

- **Finished commissioning of DTL 1-3. Had beam after only 36 hours and 100% transmission within 2 days.**

- **Started beam for DTL/CCL1-3 on Sept. 7. 100% transmission after setting all correctors to 0.**

SNS Warm Linac: DTLs and CCLs

- **The RFQ, DTLs, and CCLs 1-3 have been commissioned**
    - » **Design Energy**
    - » **Design Pulse Length**
    - » **Design Field Gradients**
    - » **Full complement of Diagnostics**

- **Three more milestones**
    - » **SCL start July '05**
    - » **Ring start January 06**
    - » **Project complete April '06**

High-Power RF Installation Progress

- **All RFQ / DTL HPRF Systems complete and operational. 2.5 MW - 402.5MHz klystron with 2-3 per HVCM.**

- **All four CCL systems are complete. 5 MW – 805MHZ klystron with 1 per HVCM.**

- **81 of 81 SCL klystrons installed. 550kW- 805MHz klystrons with typically 12 per HVCM.**
  - » **4 of 7 SCL modulators tested.**

81 klystrons out of 81 for SC linac in place

4 CCL 5 MW Klystrons

1 RFQ & 6 DTL tubes turned over to operations

Move to the Central (CLO) Control Room is planned for February '05

- **Scheduled for ~ Feb '05 (before SCL run)**

- **Design contract for consoles ready for DCS at start of FY05**

- **Console delivery ~ April (Two Arcs only)**

- **Main issue is logistics of PPS move, especially ODH system**

The number of IOCs has risen dramatically SNS

- **142 IOCs currently on Accelerator Network: (was 88 last March)**
    - » **70 VME / VXI / "soft" --- vxWorks / linux - based   (52)**
        - – **50 in warm linac (used during run)**
        - – **20 in SCL**
        - – **1   Linux-based Soft IOC Server**
    - » **72 Intel-Pentium --- Win32-based IOCs (the "NADS")   (28)**
        - – **Wirescanners, Faraday Cups, BPMs, BCMs**
    - » **About half of the IOCs are Windows based NADs!**
- **IOC average availability much improved (no "IOC Disease")**

- **Still too many reboots**
    - » **Miscellaneous reasons**

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Global Systems installation is keeping pace

- **Timing System Installation is keeping pace**
  - » Data Link module in (almost) every IOC (including NADS)
  - » Independent fixed rep rate capability added for RF processing

- **117 MPS Channels added for DTL/CCL run (170 total)**
  - » Program to re-evaluate inputs in progress
  - » 1200 MPS inputs in full accelerator/ring system when compete.
  - » Statistics (first faults, total faults) automatically entered in E-log each night

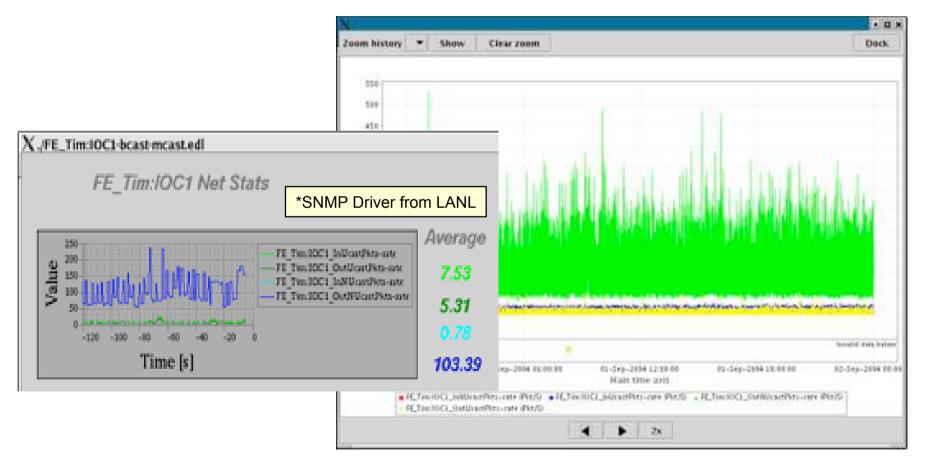| PLC interlocks	2 **(2)**	Wire Scanners	19 **(7)**
BLM_HV	6 **(0)**	LLRF	12 **(5)**
Emittance	4 **(4)**	MPS	11 **(11)**
Vaccum Interlocks	11 **(4)**	Beam Loss Monitors	40 **(0)**
Differential Beam Current	6 **(6)**	Faraday Cup (2 per FC)	12 **(4)**
MagnetPower Supplies	24 **(11)**	Neutron Detectors	23 **(0)**

Network Tools are Integrated with EPICS

Network traffic integrated with EPICS via devSnmp device support*
-- data is now displayed via EDM
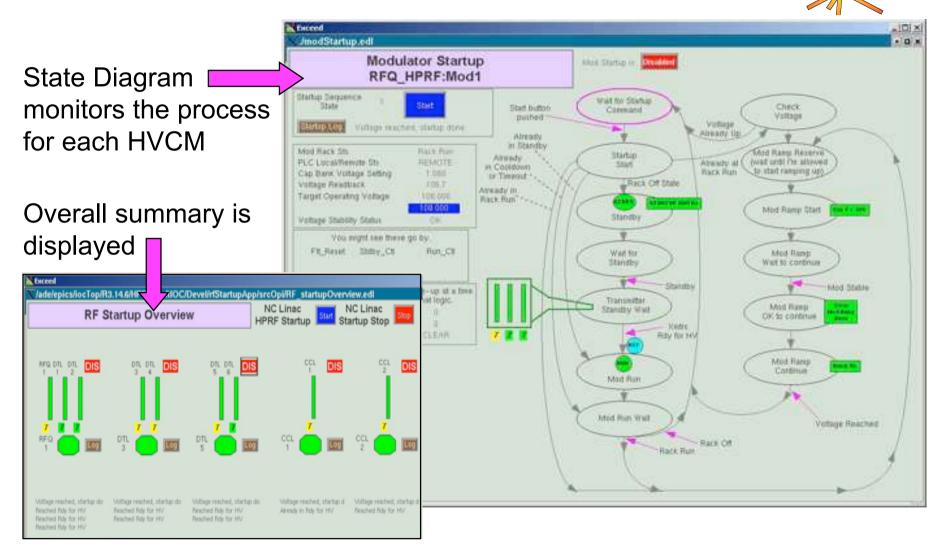-- data is now stored in the EPICS archiver

*SNMP Driver from LANL

Turn-on and Turn-off of HPRF Systems has been automated

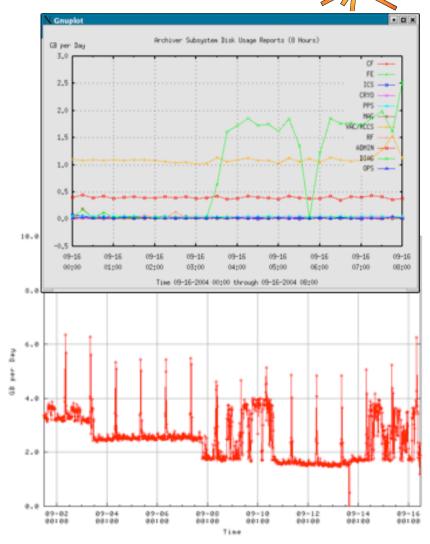State Diagram monitors the process for each HVCM

Overall summary is displayed

Archiver Issues Attacked on Four Fronts

- **Archiver Engine**
  - » **New LANL archive engine is now running (Kasemir)**

- **Archive Retrieval Tools**
  - » **New Java-based client-server archive viewer has been deployed. (Chevtsov)**
  - » **Collaboration with JLab, LCLS and Cosylab**

- **Archive Monitoring Tools have been deployed**
  - » **Averaging ~3GB/day**

- **Work has started on Archiver data management tools.**

Archiver Status

- **SNS: Exclusively using the new toolset,**
  - » 25 archive engines running,
  - » accumulated over 100GB in only about 6 month.
- **BESSY: Successfully added new "Index" files to 200GB of data.**
- **Only known problem with Engine:**
  - » ChannelAccess 3.14.6 sometimes hangs on shutdown when there are disconnected channels.
  - » Hasn't happened for weeks, supposed to be solved in the not yet available next release of base.
- **Development of Java Viewer is out of the woods:**
  - » No crashes, more features than ever
  - » multiple axes, show original samples, indicate disconnected/invalid,
- **Biggest hassle:**
  - » Data management (backups, moving older data to other computers, ...) isn't automatic, possibly never will be, and requires one person for about 8h each week.
- **Biggest user complaint:**
  - » CGIExport, the data access via any web browser, is gone. Though inferior to the Java Viewer, users who remember it miss the zero-install CGIExport.
  - » Java Viewer offers more.
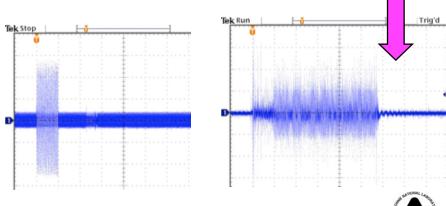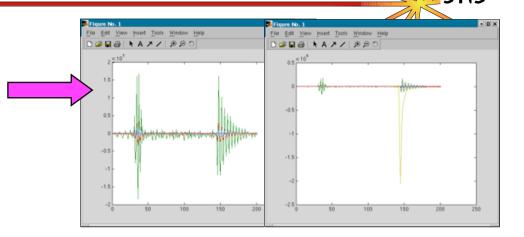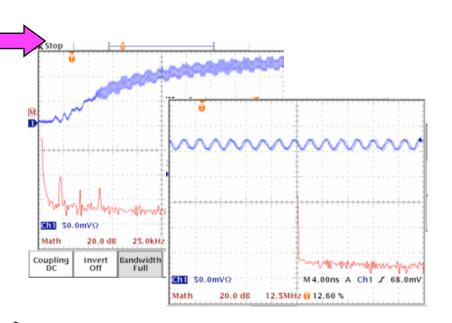 - » Java Webstart is almost as convenient as CGIExport, yet requires installation of viewer.

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The Noise Campaign Continues on many Fronts

- **BLMs**
  - » **60 Hz harmonics due to DC Power supply mounted next to Analog inputs. Improved 10X**
  - » **HVCM Noise – Varies greatly between BLM systems**

- **New   RF EMI near DTL 5,6**
  - » **~402.5 MHz on HVCM cable.**
  - » **Not yet understood**

- **Measurements everywhere**

EDM Updates (John Sinclair)

- **Current version is 1-10-1w**

- **Enhanced http support:**
  - » **EDMDATAFILES can include URLS: http://server/path, https://server/path or HTTP: & HTTPS:**
  - » **EDMFILES can also be a URL**

- **Enhanced file support:**
  - » **EDMDATAFILES also supports indirection, @/file/list or @http://server/path/list – loads EDMDATAFILES path from the file.**
  - » **Relative file names (does not start with a '/') can have directory names above the file name. (reva/llrf_main.edl)**
  - » **Current directory path is now "^/file.edl."**

- **Improved scrolling behavior to support large screens on small windows.**

- **Motif slider now has save/restore support.**

Database effort

- **Collaborating with Don Dohan at APS (In progress)**
  - » **Developing Controls Framework as sub-framework under XAL Framework**
  - » **Data IRMIS replacement to provide GUI reporting of the Controls environment**
  - » **SNS Jeri program ported to Controls framework (Finished in beta)**
- **New RdbCore schema makes this work site independent (For Oracle and MySQL, other Rdb's if needed)**
- **PV database crawler collects data by scanning IOC startup files periodically.**
- **E-Log, bypass requests, electronic checklist and facilities maintenance are implemented in RDB**
- **MPS and PPS databases and startup scripts are being generated by Jeri. Power Supply IOC database and script generation in progress.**

Lots going on at SNS

- **Just completed a DOE review with favorable results.**

- **Project planning has been approved for an upgrade to 3MW starting before project completion.**

- **Commissioning and construction going on in parallel. SCL runs will be frequent/continuous for a few months starting in July 2005.**

- **Settling into new office digs.**

- **Beam in entire accelerator in mid 2005.**

- **Beam in ring at end of 2005**

- **Beam on target April 2006**