Online Update

Elliott Wolin

GlueX Collaboration Meeting

3-Jun-2013

Outline

- Computers and Counting House - Hovanes
- Compilers, Repositories and Online Packages
- SCONS-Based Build and Release System
- DAQ Testing
- Translation Table and Simulated Raw Data
- Level 3
- RootSpy
- Miscellaneous DAQ/Online Topics
- Solenoid Test
- Controls
- EPICS – Hovanes
- JInventory System
- Summary


SHARP
LC-70LE745U
70"
LED TV
DELL
DELL


SHARP
LC-70LE745U
70" class
69.5" Diagonal
LED TV
SMART TV
3D
AQUOS
SmartCentral
hulu PLUS
YouTube
CinemaNow
vudu Apps
HDTV
HDMI × 4
DOLBY
dlna
DivX

SMART TV

Stream movies and music and access the most popular apps

Lecture en flux de films et de musique et accès aux applications les plus populaires

Reproduce películas, música y acceso a las aplicaciones más populares

3D

Full HD Active 3D for the best 3D experience

3D Active avec le Full HD crée la meilleure experience 3D

Full HD 3D activo para la mejor experiencia 3D

Fine Motion Advanced 120Hz Frame Rate Conversion

120Hz Frame Rate Conversion for sharp images even in fast moving scenes

Conversion de trame 120Hz, pour une image des plus nettes, même aux scènes de mouvement rapide

120Hz Marco tipo de conversión para imágenes nítidas incluso en escenas de movimiento rápido

BUILT-IN Wi-Fi

Built-in WiFi for easy internet connection

Wifi incorporé, pour se brancher facilement sur Internet

Incorporado Wi-Fi para conexión fácil al Internet

Compilers, Repositories, Packages

- Adopted C++11 standard (GCC 4.8.0)
  - Can use any supported feature
    - smart pointers, new thread package, tuples, etc.
- Using offline svn repository
  - https://…/trunk/online/packages
- Developed standard online package directory structure
  - Python script creates empty package
  - Max 1 shared library and/or 1 jar file per package
  - Many programs and/or scripts per package
- HOWTO in Online Wiki page

Example Package and SVN Directory Structure

```
$ create_online_package   fred
$ tree fred/
fred/
|-- doc
|   `-- SConscript
|-- java
|   |-- org
|   |   `-- jlab
|   |       `-- halld
|   |           `-- fred
|   `-- SConscript
|-- SConstruct
|-- scripts
|   `-- SConscript
`-- src
    |-- binsrc
    |   `-- SConscript
    |-- libsrc
    |   `-- SConscript
    `-- test
        `-- SConscript
```

Build and Release System

- SCONS build system based on Python
  - Use scripting language to call build specification functions
  - One SConstruct and many SConscript files per package
  - Users customize SConscript files (single line)
  - $ scons install

- Work in your own account and directories
  - Special scripts check out and build entire online system
  - Special accounts for operators (hdops) and code managers (hdsys)

- Official release via hdsys account only
  - In /gluex/builds
  - Local install in your own directory
  - Special scripts to make official releases

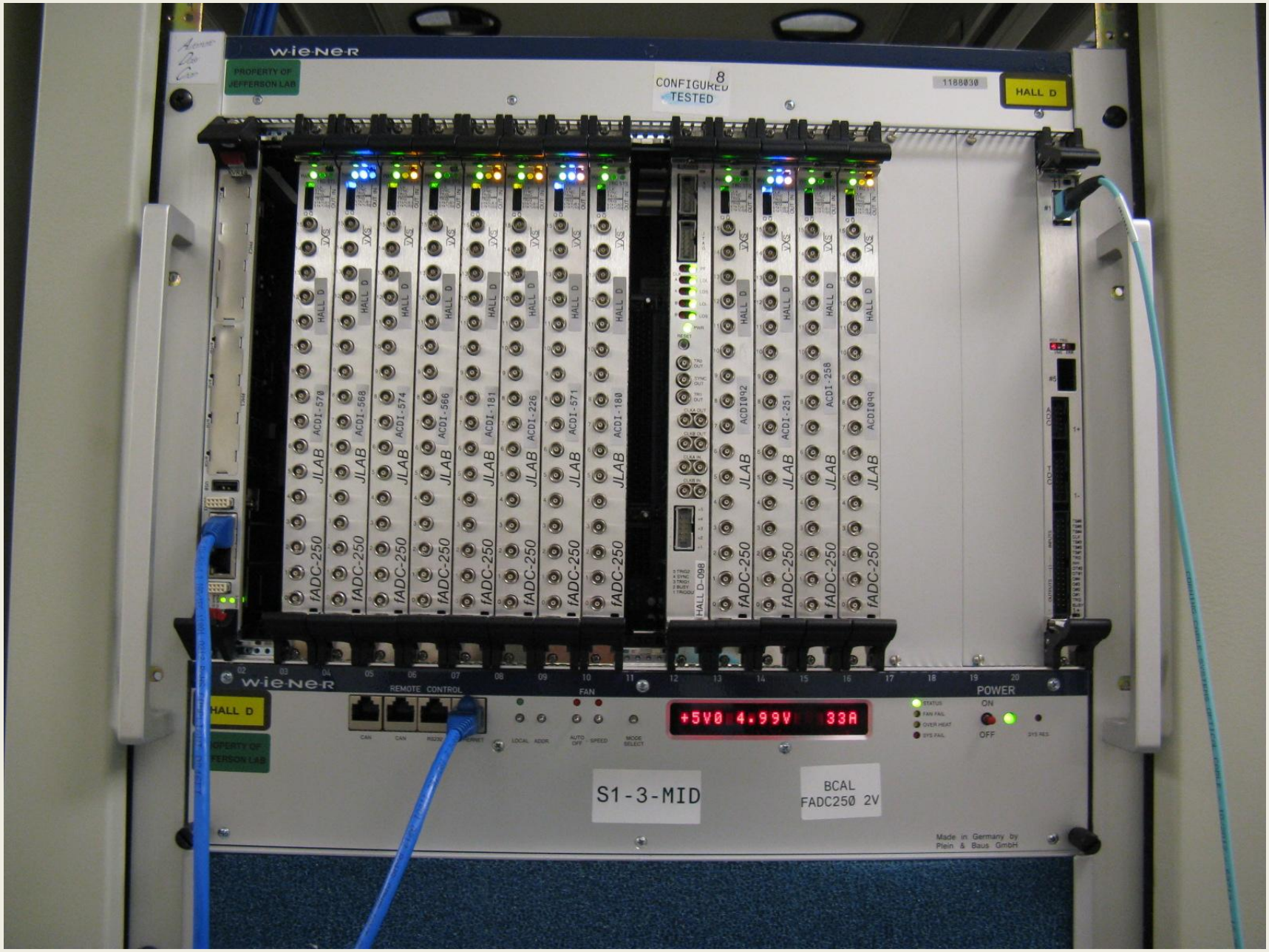
- HOWTO in Online Wiki page

```
$ build_online_release  -h

Usage:
 build_online_release [options] someReleaseDirectory

Builds/installs software in an existing online release directory someReleaseDirectory.  Optionally can check out
all online software packages from SVN into a new directory structure, or can  update an existing directory structure
to the latest SVN version.  SVN version can be the default or a tagged version.


Examples:

To check out online software into a new directory structure newRelease:
   build_online_release newRelease --checkout

To update and rebuild an existing release:
   build_online_release oldRelease --update

To just rebuild an existing release:
  build_online_release oldRelease

Note: the default SVN repository is:   https://halldsvn.jlab.org/repos/trunk/online/packages
     the default tags repository is:  https://halldsvn.jlab.org/repos/tags/online/packages


Options:
 -h, --help           show this help message and exit

 Operation Options:
   --checkout         Check out code before build/install
   --update           Update existing code before build/install
   --noBuild          Do not build anything
   --noCPP            Do not build C/C++
   --noJava           Do not build Java
   --noInstall        Do not install
   --force            Ignore errors in options

 Repository Options:
   --repo=REPO        SVN repository URL
   --tagsRepo=TAGSREPO
                      SVN repository URL for tagged versions
   --tagName=TAGNAME   Tag name of tagged version

Note...does not modify the SVN repository in any way, in particular it does NOT create tagged versions in SVN.
```

DAQ Testing (from Dave Abbott)

- 9 of 12 crates operational (need more ROC's, procurement in progress)
  - Gbit plus one 10 Gbit Ethernet interface
  - New TI modules in each DAQ crate
- 6 EMU (event builder) nodes
  - Dual Infiniband/Ethernet interfaces
- RAID system
- Trigger crate (TS, TD)
- CODA3 software installed
- All components thoroughly tested at low rates
  - Trigger, software, firmware and configuration problems solved
- High rate testing and multi-stage event building to begin soon
  - Eventually test full trigger system incl. global trigger crate (CTP, GTP and SSP)


wiener
PROPERTY OF JEFFERSON LAB
CONFIGURED
TESTED
HALL D
REMOTE CONTROL
FAN
POWER
+12V 12.0V 0.6A
T1-1-TOP
TAGM
FADC250 1V
Made in Germany by Plein & Baus GmbH

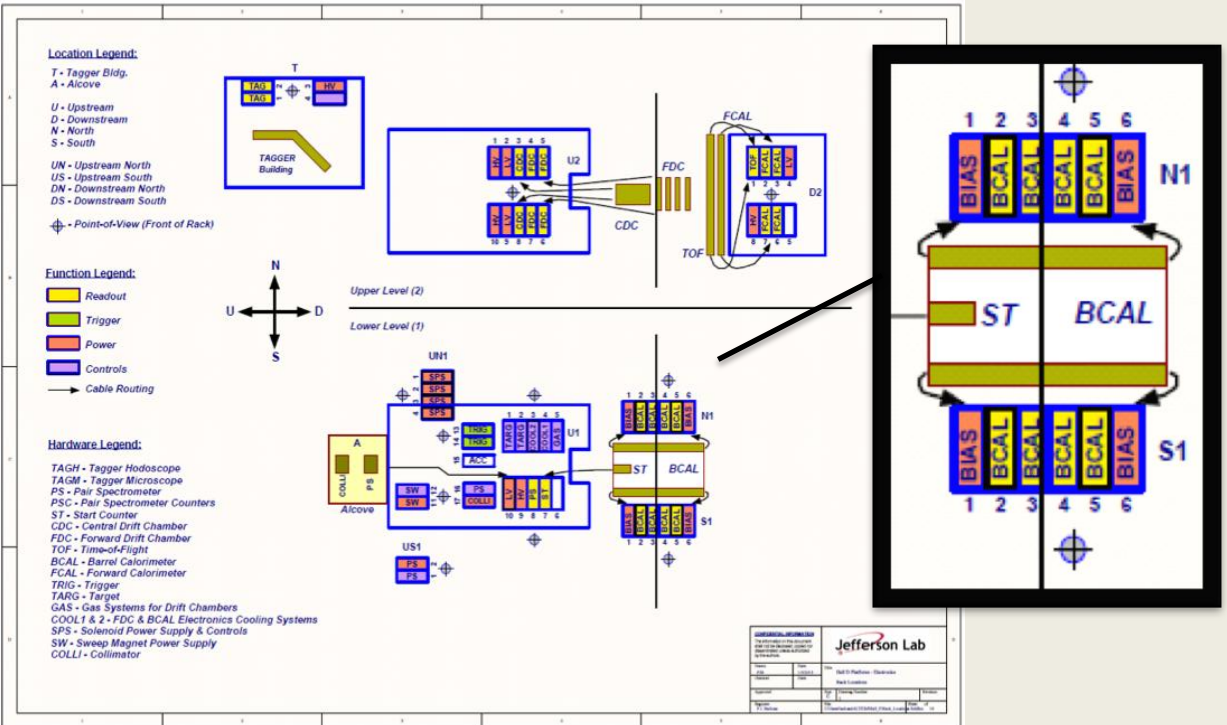

wiener
PROPERTY OF JEFFERSON LAB
CONFIGURED 8
TESTED
1188030
HALL D
JLAB
fADC-250
ACDI-570
ACDI-568
ACDI-574
ACDI-566
ACDI-181
ACDI-226
ACDI-571
ACDI-180
ACDI092
ACDI-251
ACDI-258
ACDI099
HALL D-098
REMOTE CONTROL
FAN
POWER
ON
OFF
+5V0 4.99V 33A
S1-3-MID
BCAL
FADC250 2V
Made in Germany by
Plein & Baus GmbH

Translation Table

- Slides from Dave Lawrence
- Crate/board info from Fernando B.
- Next generate and process simulated raw data
  - Uncompressed vs compressed formats (x3)

DAQ to Detector Translation Table

- The Translation Table is used to convert from DAQ system coordinates (rocid, slot, channel) into detector-specific coordinates (e.g. module, layer, sector, end for the BCAL)
- Much of this information is currently kept in a spreadsheet maintained by Fernando
- Ultimately we need this to come from CCDB or Conditions DB



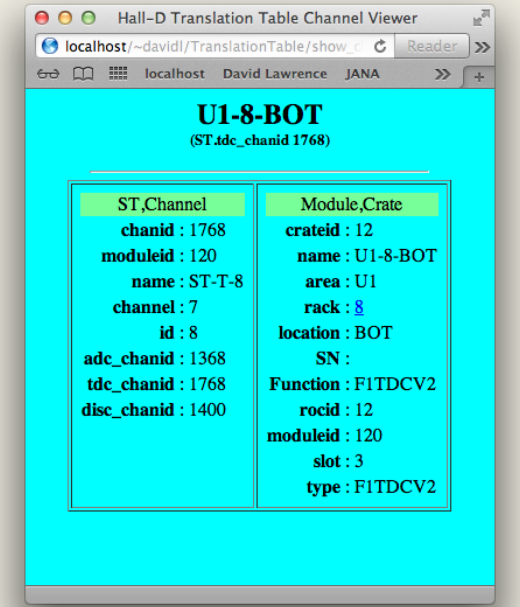
Fernando has documented the electronics system in several GlueX-docs. Most of the channel information is collected in a single spreadsheet file with 72 "sheet"s (one for each crate) that he maintains outside of the DocDB.*

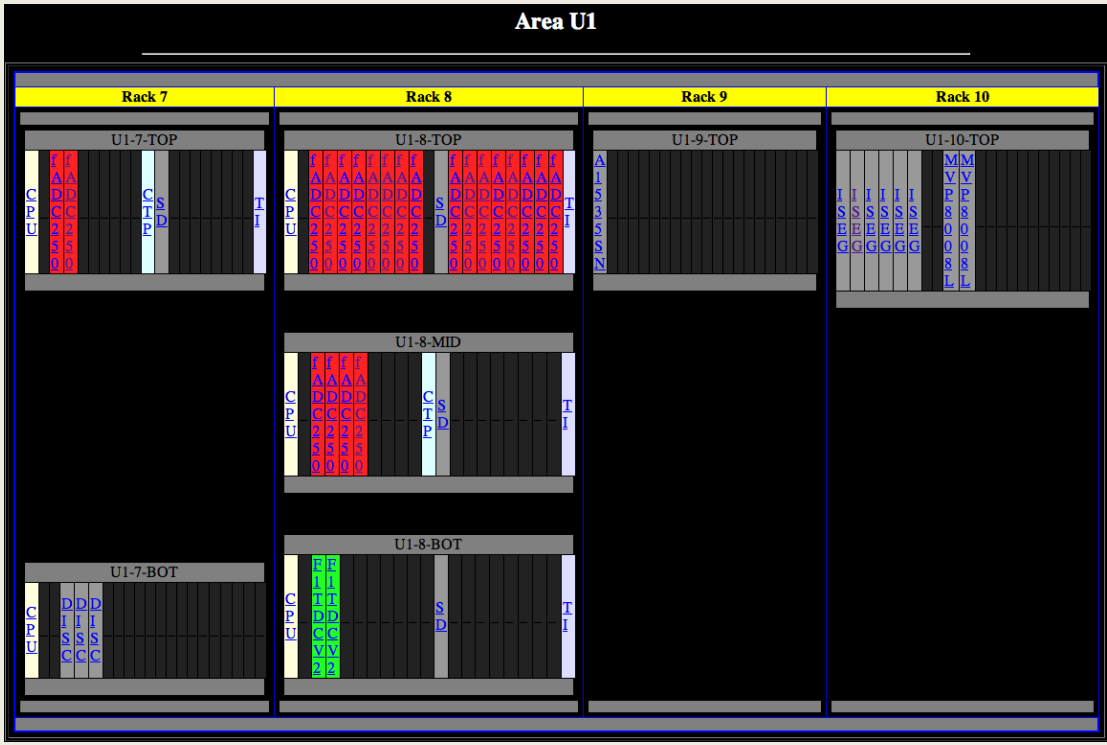
**** GlueX-doc-1035***
GlueX-doc-1452
GlueX-doc-747

DAQ to Detector Translation Table

- Spreadsheet is converted into CSV formatted file
- CSV file converted into SQLite DB via Python script
  - Most knowledge of the detector system indexing is embedded in Python script
  - Each detector system has dedicated table with columns appropriate to the indexing of that channel (e.g. ring, wire for CDC but package, chamber, wire for FDC wires …)
  - CDC pin assignments are irregular so must come from external map (courtesy Naomi)

- PHP web pages set up to browse the SQLite DB and draw some simple graphics to display the rack/crate/module layout





DAQ to Detector Translation Table

tt.xml

tt.xml 〉 No Selection

```xml
<!-- GlueX Translation Table for converting between DAQ and Detector coordinates    -->
<!-- Created:, 2013-05-28 13:16                                                      -->
<!-- This file was autogenerated by the script: tt_db2xml.py which can be found at: -->
<!-- https://halldsvn.jlab.org/repos/trunk/online/src/TranslationTable               -->

<halld_online_translation_table version="0.2">
  <crate number="1" type="VXS">
    <slot number="1" type="CPU">
    </slot>
    <slot number="3" type="fADC250">
      <channel number="0" detector="TAGM" col="1" row="1"/>
      <channel number="1" detector="TAGM" col="1" row="2"/>
      <channel number="2" detector="TAGM" col="1" row="3"/>
      <channel number="3" detector="TAGM" col="1" row="4"/>
      <channel number="4" detector="TAGM" col="1" row="5"/>
      <channel number="5" detector="TAGM" col="2" row="1"/>
      <channel number="6" detector="TAGM" col="3" row="1"/>
      <channel number="7" detector="TAGM" col="4" row="1"/>
      <channel number="8" detector="TAGM" col="5" row="1"/>
      <channel number="9" detector="TAGM" col="6" row="1"/>
      <channel number="10" detector="TAGM" col="6" row="2"/>
      <channel number="11" detector="TAGM" col="6" row="3"/>
      <channel number="12" detector="TAGM" col="6" row="4"/>
      <channel number="13" detector="TAGM" col="6" row="5"/>
      <channel number="14" detector="TAGM" col="7" row="1"/>
      <channel number="15" detector="TAGM" col="8" row="1"/>
    </slot>
    <slot number="4" type="fADC250">
      <channel number="0" detector="TAGM" col="9" row="1"/>
      <channel number="1" detector="TAGM" col="10" row="1"/>
```

Hall-D Translation Table Browser/Editor

localhost/~davidl/TranslationTable/index.php?table=ST

localhost David Lawrence JANA RootSpy JLab GlueX

Hall-D Translation Table Browser

TAGM : 120
TAGH : 233
PS : 290
PSC : 16
ST : 30
CDC : 3522
FDC_Wires : 2304
FDC_Cathodes : 10368
BCAL : 1536
TOF : 176
FCAL : 2801

ST			
id	adc_chanid	tdc_chanid	disc_chanid
1	1361	1761	1393
2	1362	1762	1394
3	1363	1763	1395
4	1364	1764	1396
5	1365	1765	1397
6	1366	1766	1398
7	1367	1767	1399
8	1368	1768	1400
9	1369	1769	1401
10	1370	1770	1402
11	1371	1771	1403
12	1372	1772	1404
13	1373	1773	1405
14	1374	1774	1406
15	1375	1775	1407
16	1376	1776	1408
17	1377	1777	1409
18	1378	1778	1410
19	1379	1779	1411
20	1380	1780	1412
21	1381	1781	1413
22	1382	1782	1414
23	1383	1783	1415
24	1384	1784	1416
25	1385	1785	1417
26	1386	1786	1418
27	1387	1787	1419
28	1388	1788	1420
29	1389	1789	1421
30	1390	1790	1422

- Second Python script converts to XML
  - Format based on work Elliott did a year ago
- Plan is to store compressed XML in CCDB
- Reconstruction code will unpack and interpret compressed XML to apply to DAQ generated data
- Next step is to generate raw data formatted file using mc2coda library (written by Dave Abbott) so work can begin on application of translation table in *sim-recon*

Level 3

- Talk by Justin Stevens later today
- Deferral investigated by Graham Heyes
  - Many strategies possible in CODA3
  - See minutes of Online meeting 10-Apr-2013
- Need to develop hd_online (like hd_ana)
  - JANA shell specific for online
  - Built-in cMsg, RootSpy, EVIO, ET, etc.
  - Use plugin strategy to customize

RootSpy (from Sean Dobbs)

- RootSpy provides a service for the monitoring and archiving of histograms and other data streams produced during data taking and processing.
- Sean Dobbs (NU) has taken responsibility for the further development of this package.
- An initial version of a program to collect and archive the results from the online farm has been written and is being tested.
- Substantial new features are being added to the RootSpy GUI program, including the ability to view and overlay the archived results.

Miscellaneous DAQ/Online

- Possible Online projects by DAQ group
  - Front-end configuration/management
  - Farm manager CODA component
  - Infiniband specification/purchase/installation

- Calibration DB vs Conditions DB
  - Define roles
  - Do we need conDB?

Solenoid Test

- Many changes to control system since coil tests
  - Worked well, helped with commissioning
- NI PXI fast monitoring system worked quite well
  - Crucial to understand recent quench
- Still need to tune power supply for 25H (vs 2H)
  - Communicating with Danfysik
- May need new hardware quench detector
  - NI cRIO FPGA-based system

Controls

- Many projects, distributed PLC systems (Dave Butler)
  - FCAL dark room
  - FDC cooling
  - BCAL monitoring/cooling
  - Target control
  - Gas system
  - CDC thermocouples
  - Start counter

- Labview proving to be very useful
  - PXI system and solenoid field mapper
  - Perhaps for new quench detector (cRIO)
  - Communicates with EPICS and PLC quite well
  - EPICS and other gui's?

JInventory

- Sergey Pozdniakov on board (how long?)
  - Did inventory system for CLAS
- Still discussing role and scope
  - From just inventory/repair to source for translation tables and other applications
- Will put barcodes on just about everything
  - Have portable scanners w/screens
- Soon will add electronics crates and boards
  - Using Fernando's spreadsheets

Summary

- Online software development system ready
- High rate DAQ testing starting soon
- Progress on many aspects of monitoring/L3
- Solenoid test taking lots of time!
- Slow but steady progress on other controls projects
- JInventory system about to take off

Not enough manpower in online effort!