Argonne NATIONAL LABORATORY

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Channel Access and Client Tools

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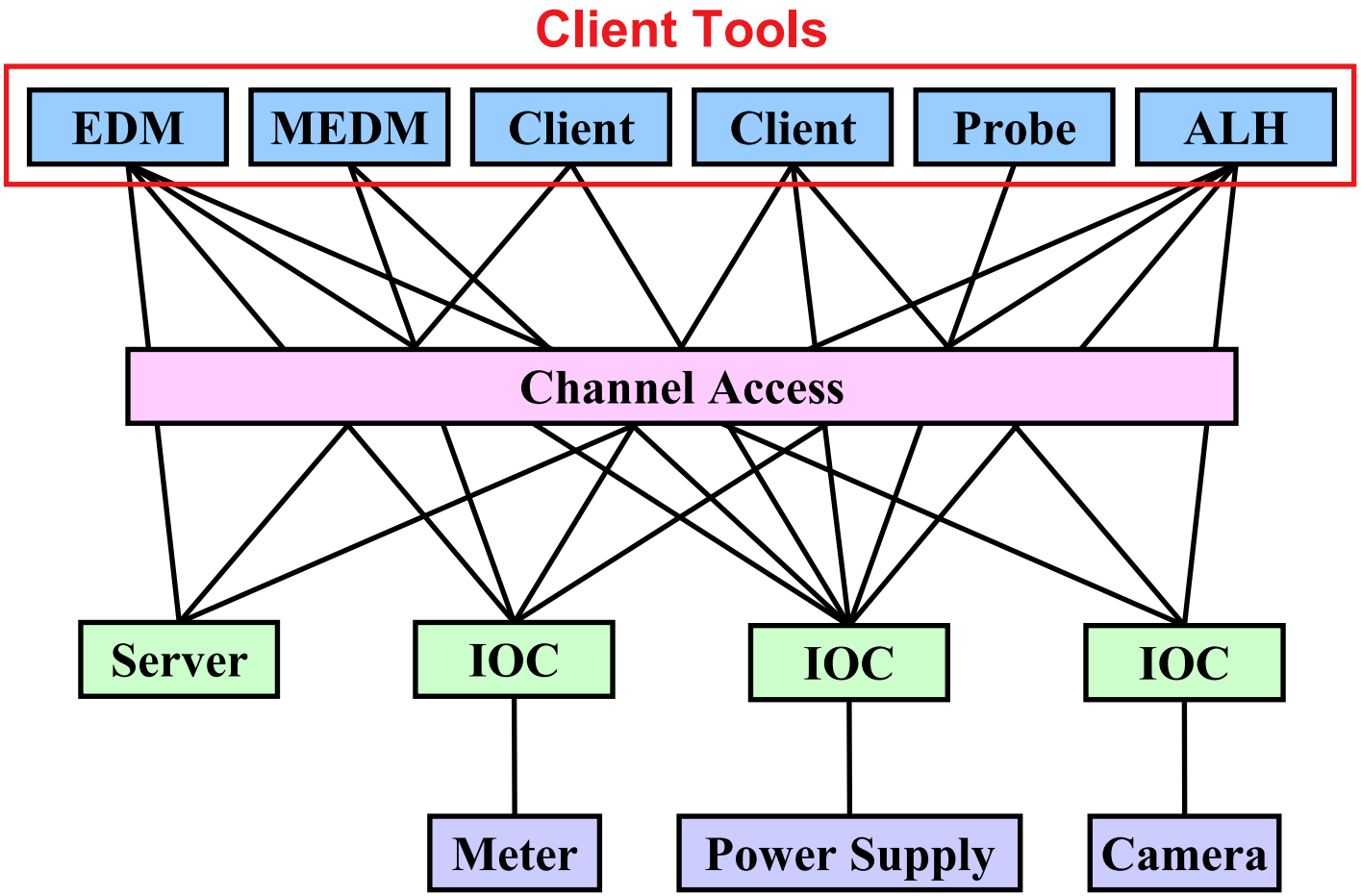
EPICS Overview



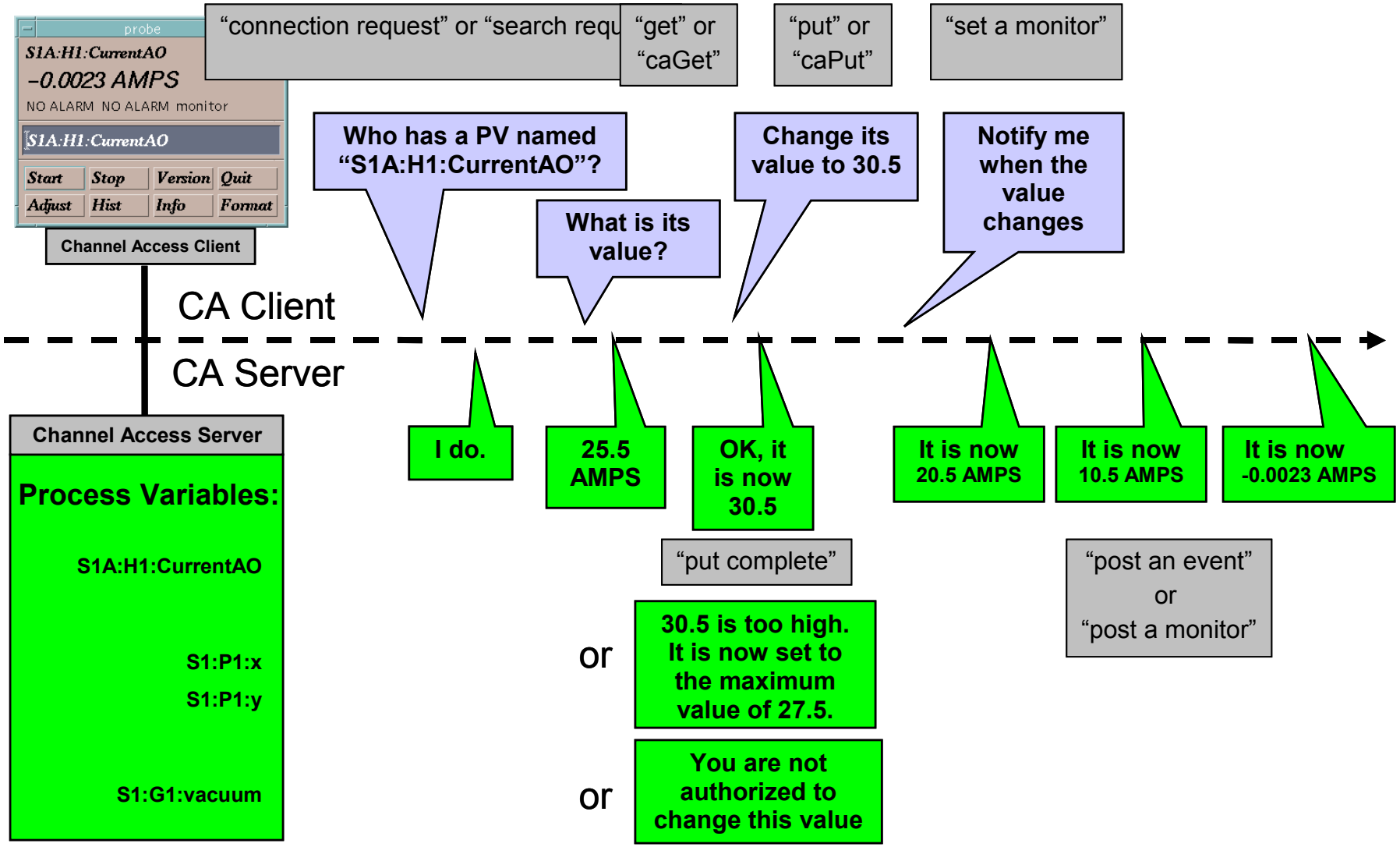
Channel Access

- The EPICS “software bus”
- Used to read and write values to/from Process Variables
- To many people, Channel Access *is* EPICS
  - Especially those that have no IOC experience
  - “Integrate X into EPICS” often means “Be able to control X via CA”
- CA is not defined by a protocol specification
  - Jeff Hill (LANL) maintains the CA client and server libraries
  - A single expert maintainer for both ensures very robust control systems

What is a Process Variable (PV)

- "A named item of data, with associated optional attributes"
  - Data is an Integer, Floating point number, enumeration value or string, or an array of any of those types
  - Attributes include timestamp, alarm status/severity, precision, engineering units string, list of enumeration strings, operator/control/ alarm limits

Channel Access in One Slide



Tools Covered in This Presentation

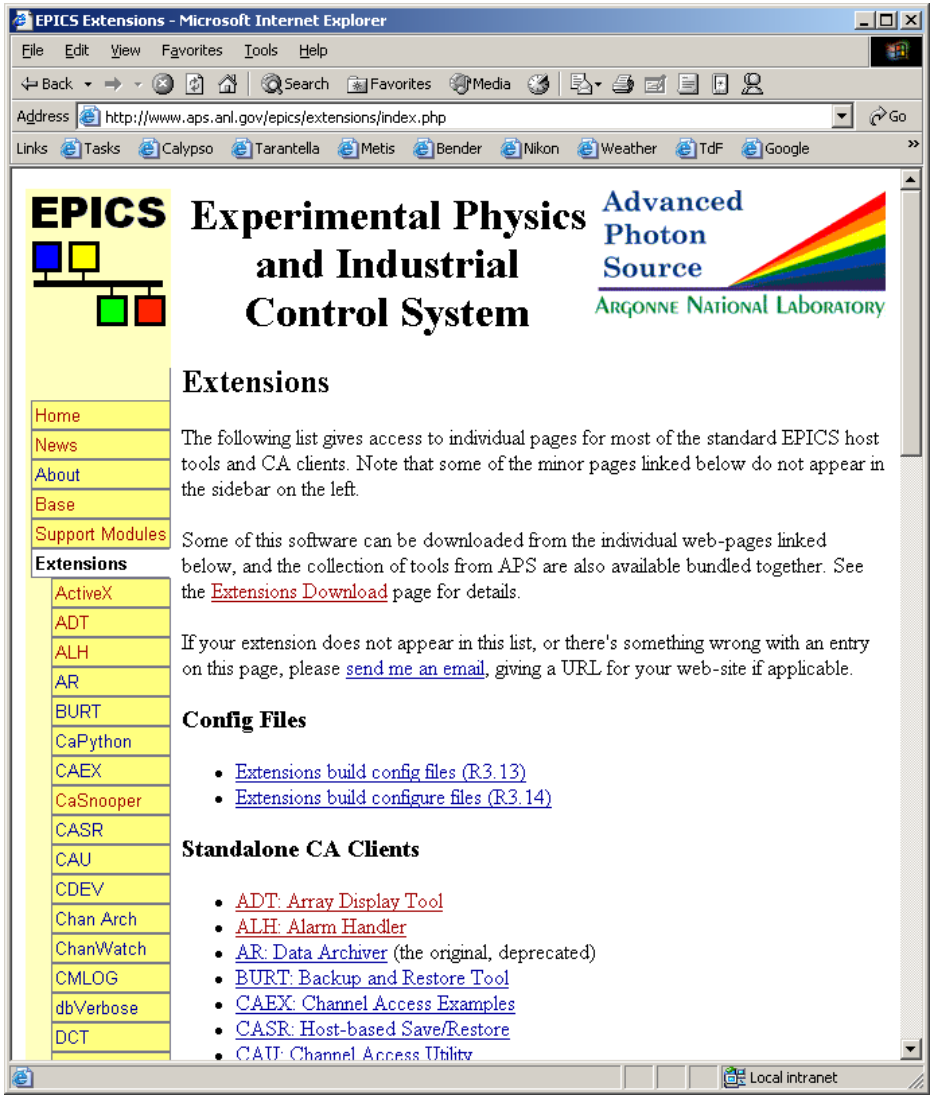
- Command-Line Tools
  - caget, caput, camonitor, cainfo
- Probe
- StripTool
- MEDM
- ALH

More Information

- There is a wealth of information in the EPICS web pages
  - http://www.aps.anl.gov/epics/index.php
- Each of the Extensions covered here has its own page with much additional information
  - Including tar files of the latest releases
- The are many other tools described there as well

- The Extensions executables are typically located at
  - …epics/extensions/bin/<platform>/<executable>
  - e.g. /opt/epics/extensions/bin/solaris-sparc/edm
  - Platforms are solaris-sparc, linux-x86, win32-x86, etc.
- The Base command line tools are typically at
  - …epics/base/bin/<platform>/<executable>

EPICS Extensions Web Page



Command-Line Tools

- There used to be several versions of these tools
- We will discuss the ones that now come with EPICS Base
- The tools we will cover are:
  - caget
    - *Gets the value of one or more process variables*
  - caput
    - *Sets the value of one process variable*
  - camonitor
    - *Monitors the value changes of one or more process variables*
  - cainfo
    - *Gets information about one or more process variables*
- All accept –h to display usage and options

Caget Example

- Get the values of two process variables

```
caget S35DCCT:currentCC S:SRlifeTimeHrsCC
```

- Returns

```
S35DCCT:currentCC     102.037
S:SRlifeTimeHrsCC     7.46514
```

Caput Example

- Set the value of a process variable

```
caput Xorbit:S1A:H1:CurrentAO 1.2
```

- Returns

```
Old : Xorbit:S1A:H1:CurrentAO    0
New : Xorbit:S1A:H1:CurrentAO    1.2
```

Camonitor Example

- Monitor two process variables

```
camonitor evans:calc evans:bo01
```

- Returns

```
evans:calc     2004-08-05 17:23:04.623245 1
evans:bo01     2004-08-05 17:23:04.623245 On
evans:calc     2004-08-05 17:23:05.123245 2
evans:bo01     2004-08-05 17:23:05.123245 Off
evans:calc     2004-08-05 17:23:05.623245 3
evans:calc     2004-08-05 17:23:06.123245 4
evans:calc     2004-08-05 17:23:06.623233 5
evans:calc     2004-08-05 17:23:07.123183 6
```

- Use Ctrl-C to stop monitoring

Cainfo Example

- Get information about a process variable

```
cainfo S35DCCT:currentCC
```

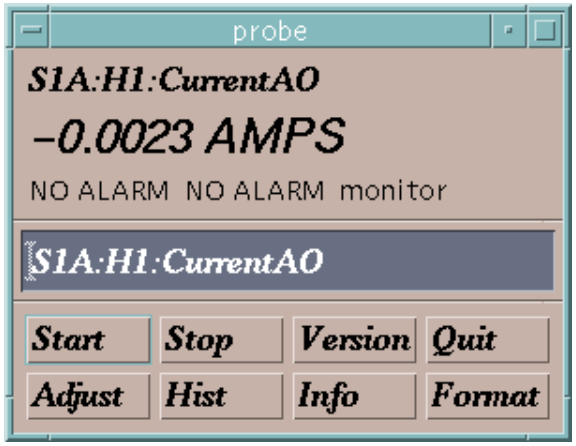
- Returns

```
State:      connected
Host:       ctlapps41188:5064
Access:     read, no write
Data type: DBR_DOUBLE (native: DBF_DOUBLE)
Element count: 1
```

- Some additional information can be found using Probe

Probe

- Simple way to get information about a single process variable
- Combines the features of caget, caput, camonitor, and cainfo in a graphical interface
- Very useful in diagnosing problems

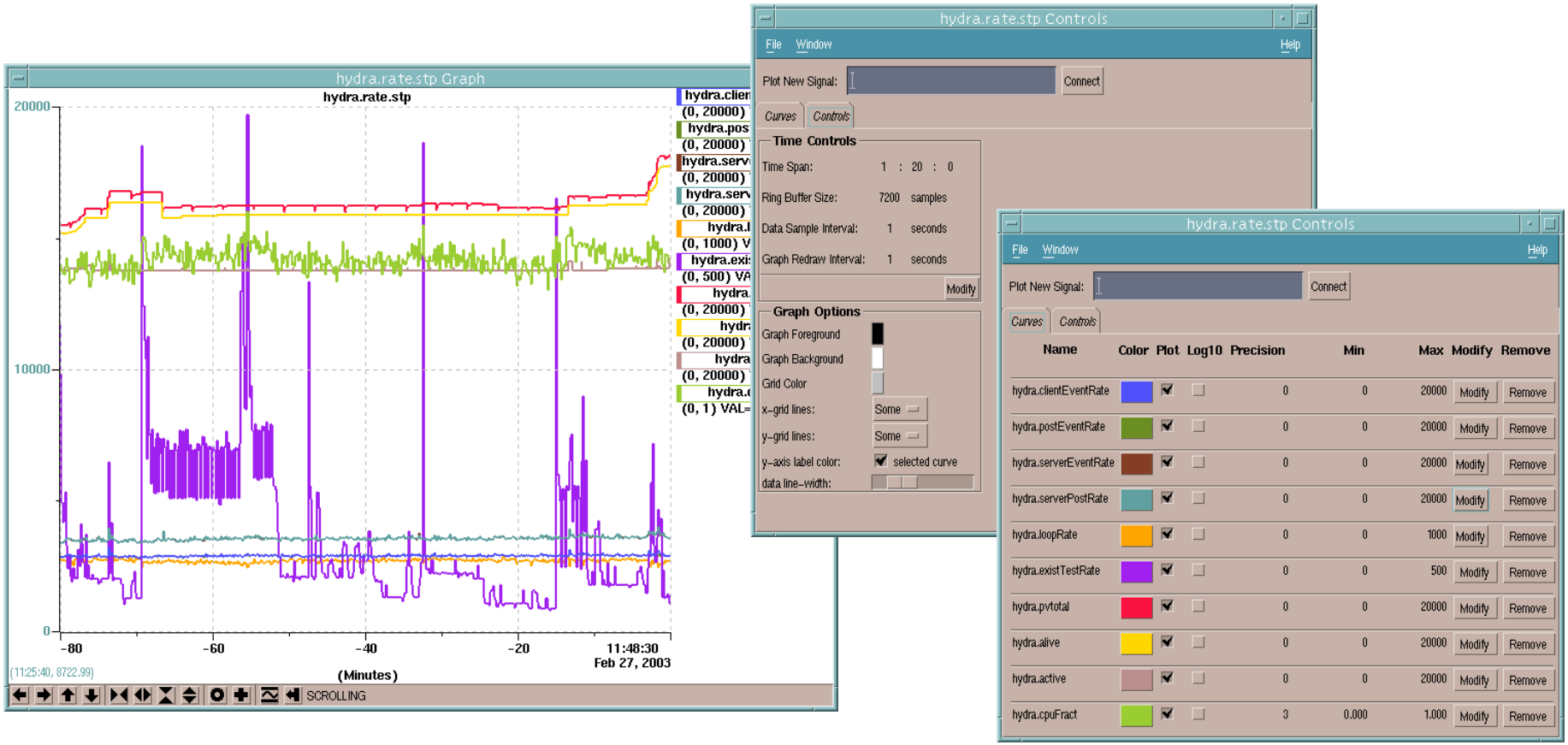


Probe Demo

Macromedia Flash Demonstration of Probe

StripTool

- Plots process variables in real time on a strip chart
- Widely used



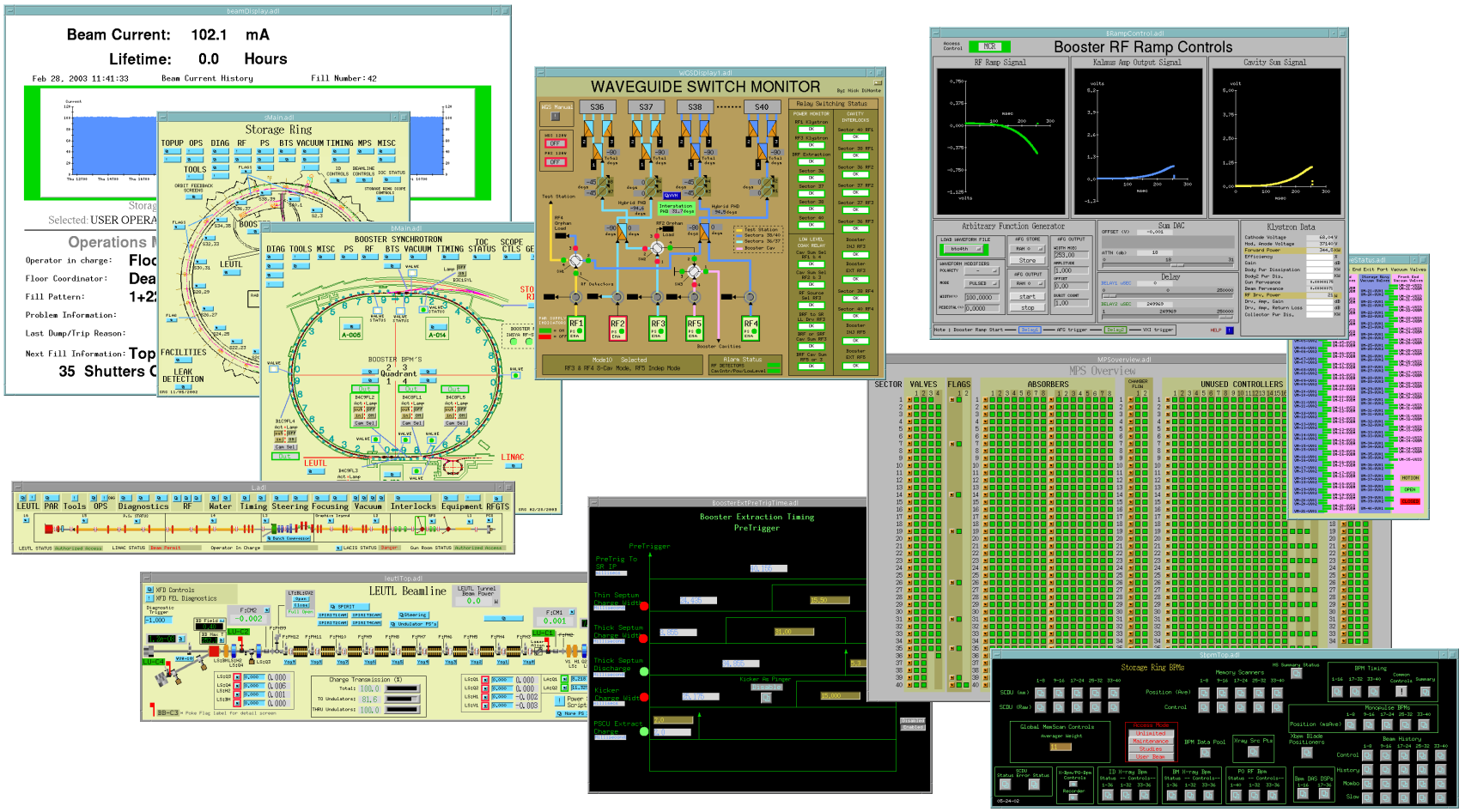
StripTool Demo

Macromedia Flash Demonstration of StripTool

MEDM

- Stands for Motif Editor and Display Manager
- The principal human interface to the APS control system
- Used worldwide at many facilities
- Creates and runs control screens

MEDM Screens



- And thousands of others

MEDM

- MEDM is very reliable at both design and run-time
- However it is very hard to extend
  - Not written in Object-Oriented style
  - Maintainer has recently moved to other responsibilities
- APS will only fix major bugs found in MEDM now
- Not a good choice for a new control system
  - Use EDM instead (upcoming lecture)

ALH

- Stands for Alarm Handler
- Important GUI application in the APS Control Room
- Brings alarms to the operators' attention
  - It dings and flashes
- Can be configured to require the operator to acknowledge alarms
- Provides a hierarchical display
  - Allows managing alarms in overview or in detail
- Provides guidance for handling specific alarms
- Logs alarms and displays alarm history

ALH

- ALH will be covered more fully in another lecture