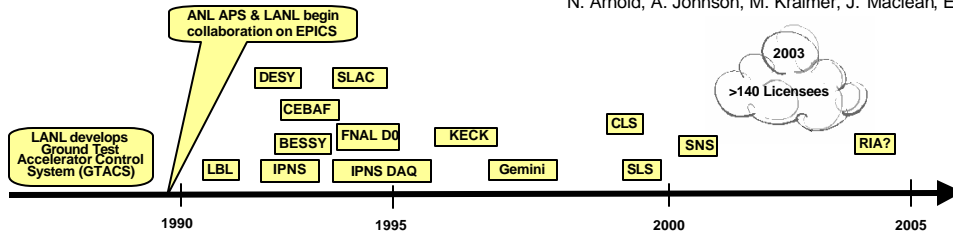


# EPICS Development; Past, Present, and Future

## ASD Controls & AOD Beamline Controls and Data Acquisition

N. Arnold, A. Johnson, M. Kraimer, J. Maclean, E. Norum



Locations within a country may be inaccurate

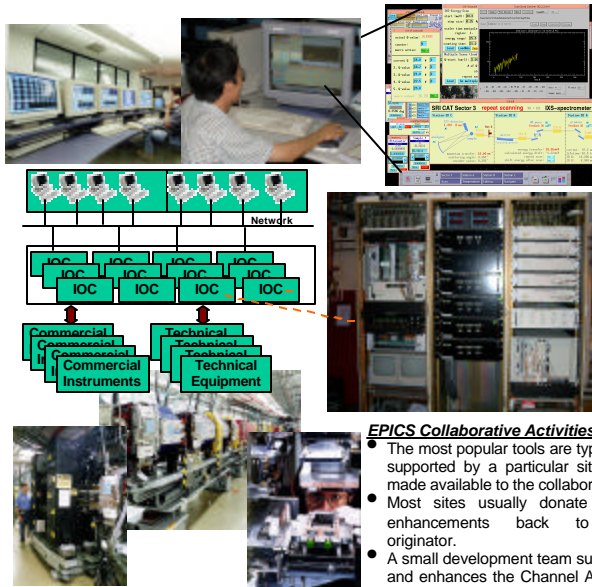
## EPICS Primer

**Definition:** EPICS is a collection of software tools developed collaboratively that can be integrated to provide a comprehensive and capable control system. Examples of available tools include:

- ? Graphical Display Programs
- ? Strip Charts
- ? Alarm Managers
- ? Error Loggers
- ? Archiving Programs
- ? Closed-loop Control Algorithms
- ? State Transition Programming
- ? Hardware I/O Drivers
- ? Support for Real-time Computing Environments
- ? Image Analysis

### Key Concepts

- EPICS Channel Access protocol defines the mechanism by which client programs communicate with servers.
- Clients access data in any of the servers by a simple name (e.g. "set ANS:HEATER on"); they do not have to know how the device is interfaced or where it resides.
- Most servers are implemented with EPICS iocCore, a set of real-time software tools designed to run on Input/Output Controllers (IOCs). IOCs are networked computers that provide the direct interface to the technical equipment.



### EPICS Collaborative Activities:

- The most popular tools are typically supported by a particular site and made available to the collaboration.
- Most sites usually donate their enhancements back to the originator.
- A small development team supports and enhances the Channel Access Protocol and the iocCore toolkit.
- At EPICS Collaboration Meetings, users share experiences, ideas, and future plans.

## Recent Developments

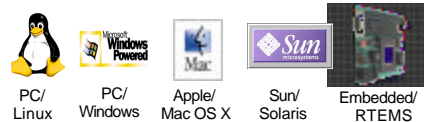
- ? VDCT – Visual Database Configuration Tool  
Open Source, developed by COSYLAB (Slovenia)
- ? caPython - developed at FermiLab
- ? labWindows IOCs – developed at ORNL/SNS
- ? EDM – Extensible Display Manager – ORNL
- ? Network based devices
  - GPIB LAN server
  - Serial LAN server
  - Modbus
- ? Java Channel Access Support
- ? Open-source Licensing

## Operating-System Independence

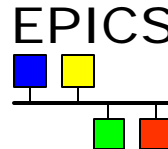
An 'IOC' used to mean 'a VME processor running the vxWorks real-time operating system'.



With the release of EPICS R3.14 these limitations have been removed. Now an IOC can also be any of:



This greatly increases the range of EPICS applications and makes EPICS an attractive solution to the controls needs of even small laboratories and individual beamline developers.



## The Future



To keep a control system up to date in the fast moving field of computing requires forward thinking. Recently, an international task force, the "EPICS 2010" committee, was formed to propose long term enhancements to EPICS necessary for it to remain a viable product for the next decade. Undoubtedly, these suggestions from the task force will require substantial resources to implement.



The first EPICS 2010 meeting held in the United Kingdom last June. The committee consisted of eighteen members from sixteen institutions in seven countries and included a representative from the APS.

The pool of EPICS expertise at the APS is a huge advantage in operating the accelerator and beamlines reliably and in supporting enhancements. However, it is becoming increasingly difficult for the APS and other EPICS sites to justify the effort to enhance, support, coordinate, and distribute EPICS when the only funding support stems from facility operating funds. Likewise, it is difficult to commit to large EPICS development projects necessary for the longevity of EPICS when the only funding available is from operational funds.

The EPICS collaboration would greatly benefit from funding for EPICS development and support from other sources. If ANL/APS is to remain as a leader in EPICS development and support, other funding sources (other than APS operating funds) must be found for this effort.