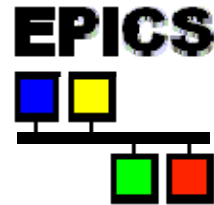




Science & Technology
Facilities Council

EPICS for MICE

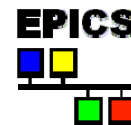
Status of the MICE slow control system



Brian Martlew
STFC, Daresbury Laboratory

11th February 2008

Brian Martlew





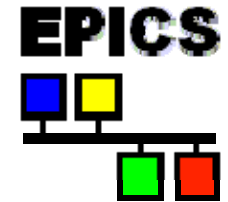
Contents



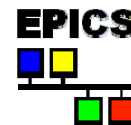
- *Overview of EPICS*
- *Why choose EPICS for MICE?*
- *Structure of the MICE slow control system*
- *Status of current work*
- *Future Plans*



What is EPICS?

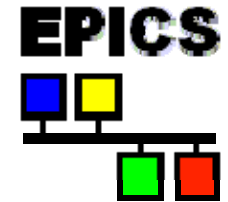


- *A Collaboration*
 - *A world wide collaboration that shares designs, software tools, and expertise for implementing large-scale control systems*
- *A Control System Architecture*
 - *A client/server model with an efficient communication protocol (Channel Access) for passing data*
 - *A distributed real-time database of machine values*
- *A Software Toolkit*
 - *A collection of software tools collaboratively developed which can be integrated to provide a comprehensive and scalable control system*



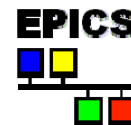


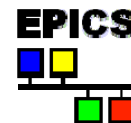
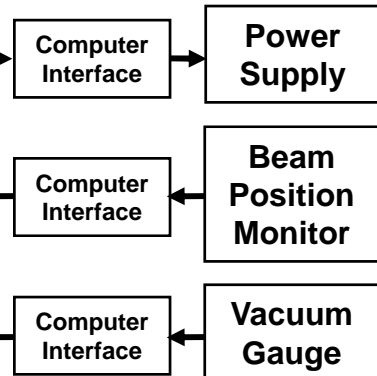
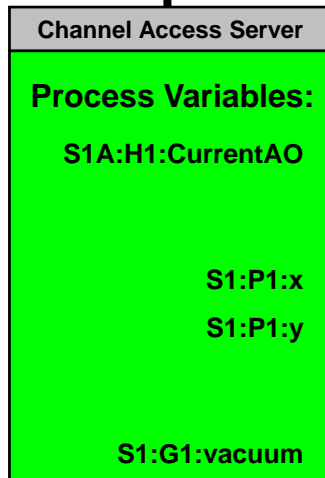
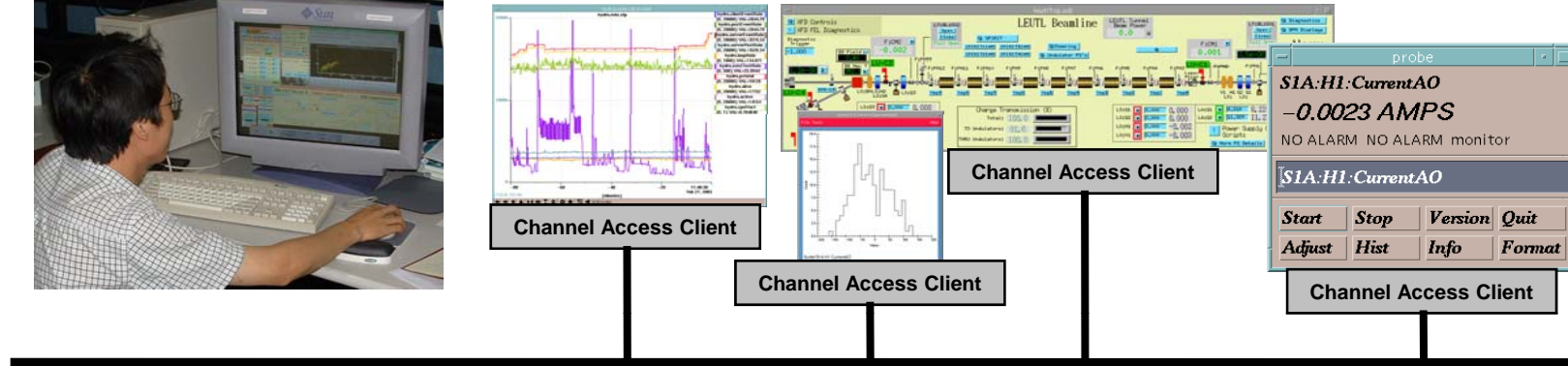
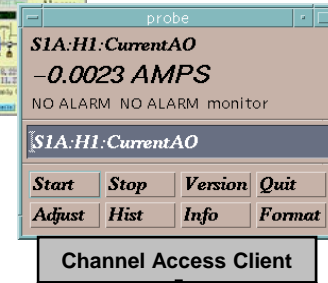
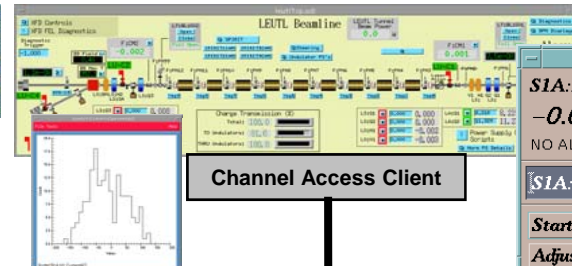
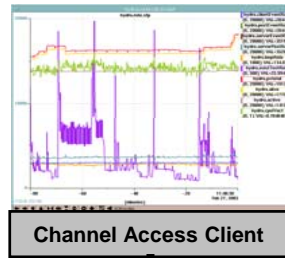
What does EPICS do?



EPICS tools are available to accomplish almost any typical Distributed Control System (DCS) functionality, such as:

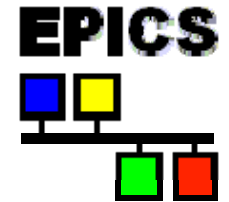
- *Remote Control & Monitoring of Technical Equipment*
- *Data Conversion/Filtering*
- *Closed Loop Control*
- *Access Security*
- *Equipment Operation Constraints*
- *Alarm Detection/Reporting/Logging*
- *Data Trending/Archiving/Retrieval/Plotting*
- *Automatic Sequencing*
- *Mode & Facility Configuration Control (save/restore)*
- *Modeling/Simulation*
- *Data Acquisition*
- *Data Analysis*



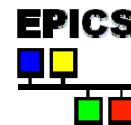


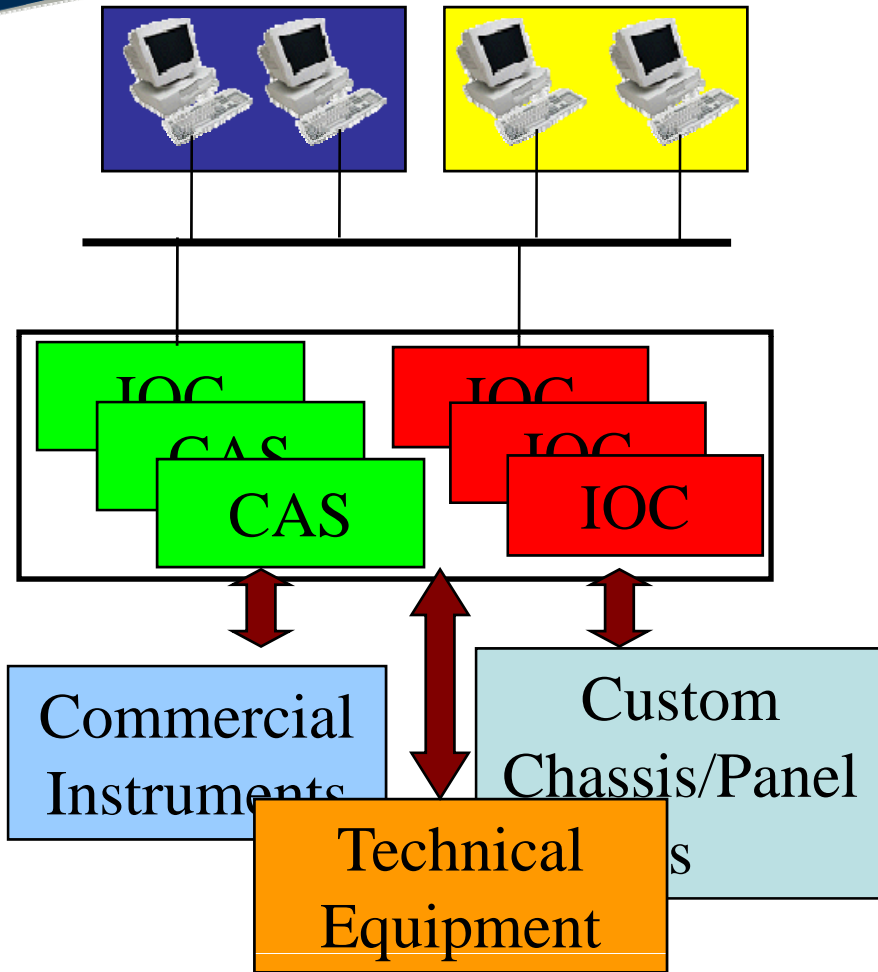


Why choose *EPICS* for *MICE*?



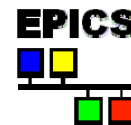
- *It's free*
- *It's Open Source*
- *There are lots of users*
- *All a client needs to know to access data is a PV name*
- *You can pick the best tools out there ...*
- *... or build your own*
- *The boring stuff is already done*
- *There is a lot of expertise available*
- *A good contribution becomes internationally known*
- *By following a few simple rules, you get a lot for free*

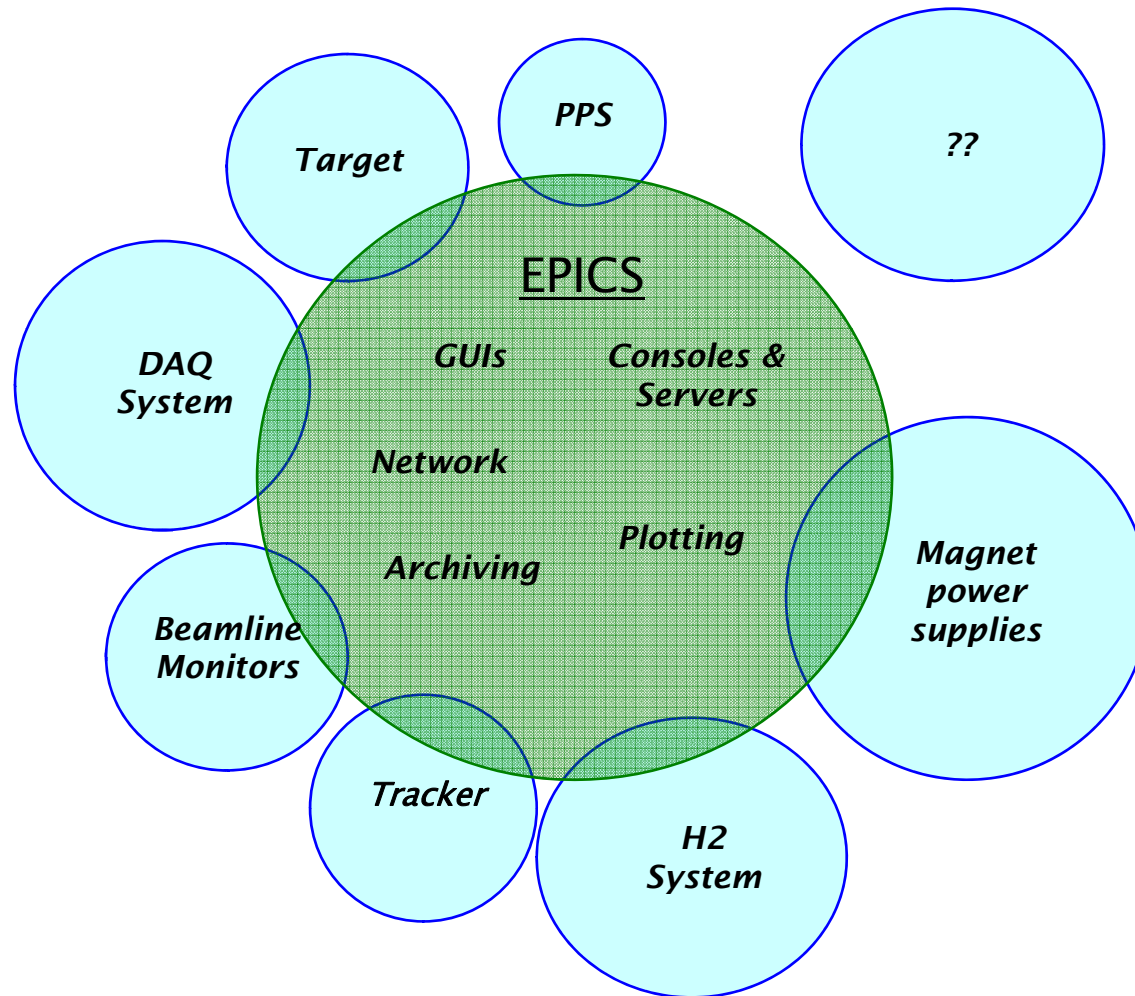




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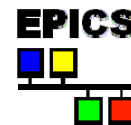
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How do I join in?



First...

Talk to me - Brian Martlew

- B.G.Martlew@dl.ac.uk
- +44 (0)1925 603769

Then...

If you are feeling brave or have previous EPICS experience go ahead and “do-it-yourself”

Or...

The Daresbury controls group will be happy to help

Or...

Get help wherever you can

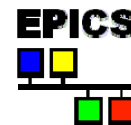
EPICS website

Mailing lists

Commercial support

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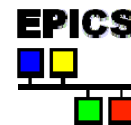




“Do-it-yourself”

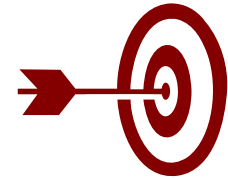
There are essentially two different approaches:

- *Standard IOC*
 - *Analogue signals*
 - *Digital I/O*
 - *Serial (RS232, 485)*
 - *Motor drives*
- *Portable Channel Access Server*
 - *Complex software sub-systems*
 - *Unusual or non-standard hardware*





Target Drive



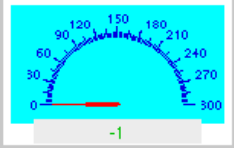
- *Stepper motor and gate valve controls and interlocks are installed and commissioned.*
- *Issue with motor drive control is being investigated.*
- *Offline target control system has been completed at DL and is being transported to RAL right now.*



MICE Target Control

TARGET PSU

PSU Set Voltage:



0/c IL R: 0.02 Amps PSU Current Phase R
0/c IL S: -0.01 Amps PSU Current Phase S
0/c IL T: 0.04 Amps PSU Current Phase T

Electronics Standby: **ON**
External Interlock: **OFF**

Display Interlocks: OFF ON RESET (for both Standby and Interlock)

Power Electronics: **OFF**
Display Interlocks: OFF ON RESET

TARGET EXTRACTION MOTOR

Mot Upper Limit:
Mot Lower Limit:
Stepper Power:
Status:
Buttons: Abort Home

TARGET ACTUATOR

Cool Coil (Top): 0.2 C
Coil 6 (Top): -0.8 C
Coil 12 (Middle): -0.1 C
Coil 18 (Bottom): 0.2 C
Cool Coil (Bottom): 0.0 C

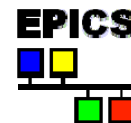
Coolant Flow: -0.014

VACUUM VALVE

Vac Valv Closed
Vac Valv Open

ISIS VESSEL

TARGET EXTRACTION MOTOR
Move Target Out Of Vessel
Move Target Into Vessel





Beamline Power Supplies



- *Control interface software is complete*
- *Testing has only been possible with RS232 interface because of late delivery of RS422 modules.*
- *All hardware now available and full commissioning of the control system can take place in the next two weeks.*



Danfysik MPS 8000 - Status - TEST-PC-MPS-01

TEST-PC-MPS-01

Status	Extended Status
current first	External Input 1
Main Power Off	External Input 2
Polarity Normal	External Input 3
Polarity Reversed	External Input 4
Regulation Transformer <> 0	Spare Input 3
DAC 16	Spare Input 4
DAC 17	Spare Input 1
% / Amps	Spare Input 2
Spare Interlock	Battery Low
One Transistor Fault	Polarity Switch Enable
Sum - Interlock	Status of TP8
DC Overcurrent (OCP)	DC Overload
DC Overload	
Regulation Module Failure	
Preregulation Failure	
Phase Failure	
MPS Waterflow Failure	
Earth Leakage Failure	
Thermal Breaker / Fuses	
MPS Overtemperature	
Panic Button / Door Switch	
Magnet Waterflow Failure	
Magnet Overtemperature	
MPS Not Ready	
Spare	

Numerical Status	
Status	0x555555
First	0x8421f0
Extended	0xaaa0

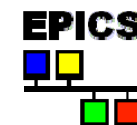
Reset Exit

Danfysik MPS 8000 - ADCs - TEST-PC-MPS-01

TEST-PC-MPS-01

Raw ADCs	Analogs
0 123	Current (12 bit) 123 A
1 111	Field 1.11 T
2 222	Output Voltage 22.2 V
3 151	Internal +15V sup. 15.1 V
4 156	Internal -15V sup. -15.6 V
5 49	Internal +5V sup. 4.9 V
6 -66	Delta temperature -6.6 C
7 777	Trans. Bank Vce 777 V
8 88888	Output Current 888.88 A
9 0	Aux. Iout 0.00 In
10 0	Aux. Iout 0.00 In
11 110	Iout Optional 1.10 In
12 120	Vout Optional 1.20 Vn
13 130	Water flow 13.0 l/s
14 -111	Free on plug P29 -1.11 V
15 123	Free on plug P19 12.3 V

Exit





Network



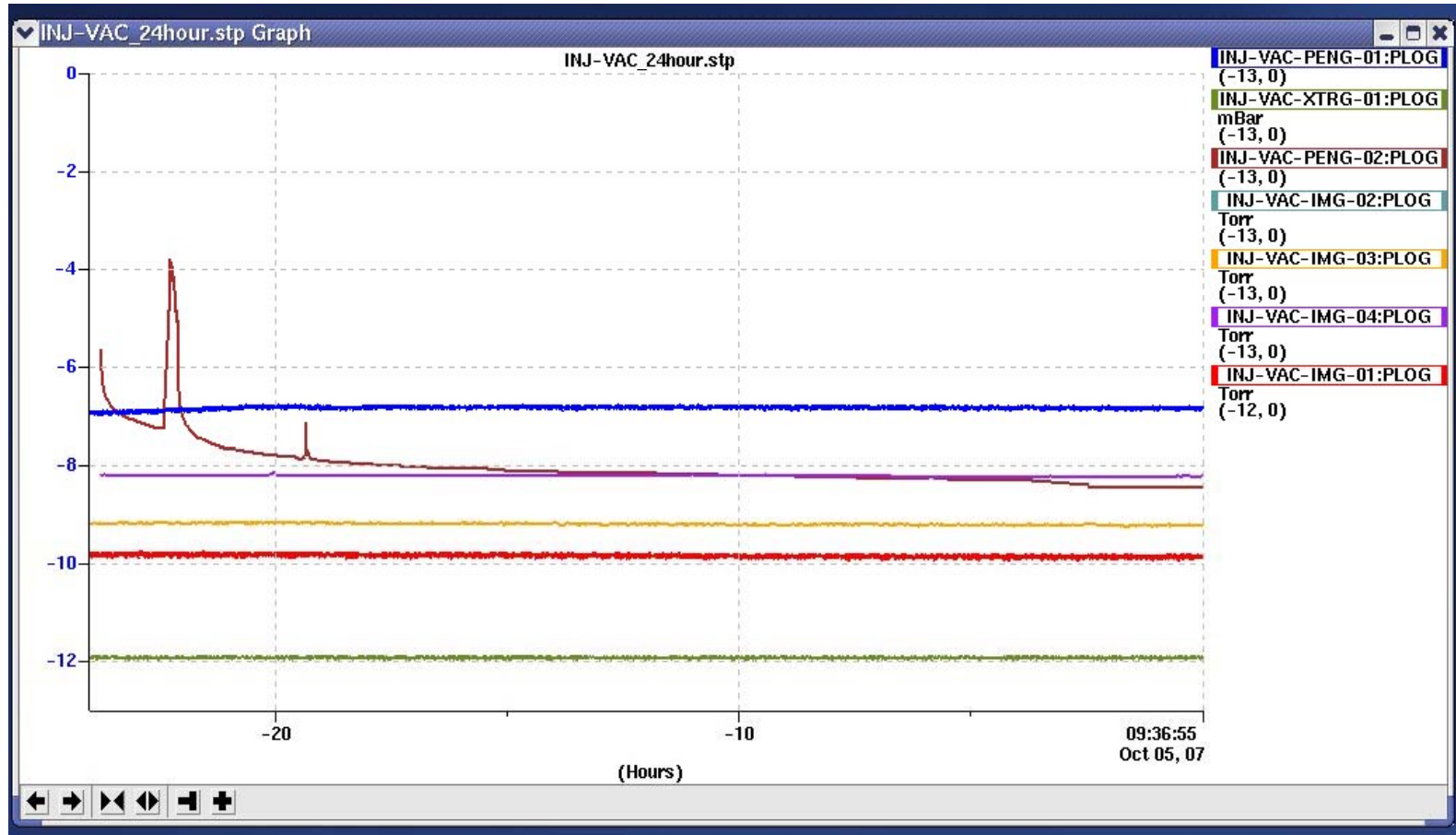
- *All network switches/routers in place*
- *Configuration has been done by RAL network group but still not working. This is being investigated.*
- *Still waiting for network cable installation.*



Consoles & Servers

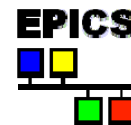


- *All hardware has been procured, software installed and tested.*
- *Awaiting completion of network before final installation in the LCR.*



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Next steps



- Set up data archiving, alarm monitoring, trend plotting
- Integration of the DAQ System
- H2 System
- RF System
- System access security



Questions

11th February 2008

Brian Martlew

