Developing a new instrument control system for ISIS: lessons learned

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Sample Environment Control Interface (SECI)

**WISH** is SETUPT Next Run 78

- **Time:** 14:55 23 October 2008
- **User(s):** John Smith et al.
- **Title:** Long title name; change by typing here!
  - **Current Run Time:** 1:12:30:25
  - **Good/ Raw Frames:** 499985 / 499998
  - **Current/ Total cu:** 165.2 / 500.2
  - **Current Period:** 1 of 5
  - **Shutter Status:** OPEN

**Beam Status**
- **TS2_current:** 0 μA
- **VAT_value:** OPEN
- **DecoupledCH4:** 302 K
- **Nb_Time_Ch:** 0
- **Nb_Spectra:** 0

**ORC**
- **ORC_STATUS:** Stopped
- **ORC_cycle:** 0.000

**Pressure**
- **G1_TK_PEN:** 0.010 mbar
- **G2_TK_PIR:** 870.000 mbar
- **G3_TURBO_PEN:** 0.010 mbar
- **G4_TURBO_PIR:** 0.073 mbar
- **G5_RPI_PIR:** 810.000 mbar
- **G7_GUIDE_TGT:** 0.059 mbar
- **G8_GUIDE_BCKH:** 0.049 mbar

**Eurotherms**
- **Sample_Temp:** 0.000 K
- **cell_top:** 0.000 K
- **cell_bottom:** 0.000 K
- **Orange_cryo:** 0.000 K
- **Low_T_Furnace:** 0.000 C
Reasons for replacing

- Increasingly complex instruments
  - Motion control
  - Cameras, robots etc.
- Difficult to extend or modify
  - Close-coupled
  - Multiple responsibilities
- Limited opportunities for collaboration
  - Dependent on LabVIEW
  - Windows only
- Mantid integration
The new system

• EPICS-based
  – Well established and defined framework
  – Client/server model
  – Used at Diamond and the SNS

• Will replace the existing control system
  – ~30 instruments

• Initially targeted for LARMOR and CHIPIR

• SECI++
EPICS – a one slide introduction

Publishes Process Variables (PVs)
- IN:LARMOR:EUROOTHERM:TEMP1
- IN:LARMOR:EUROOTHERM:TEMP1:SP
The project

• Large scale software project
• Hired an external project manager from Tessella
• Initial “pilot project”
• Project officially started in December 2012
• Developing while maintaining old system!
• 2 contractors
Scrum - how it works

Sprint Planning

Product Backlog

Sprint Backlog

Sprint

Sprint Planning

Sprint

3 Weeks

4 Weeks

Sprint Ends

Useable Chunk of Software

Sprint Review/Demo

Sprint Retrospective
The white board (current version)
The approach

• Two instruments = two different methods
  – CHIPIR = EPICS and SECI in parallel
    • Relatively simple instrument
    • Basic read-only GUI required
    • Integrating LabVIEW
  – LARMOR = full EPICS system
CHIPIR

- IvDCOM
  - Vls requires no alteration
  - Configuration files for the IOCs are auto-generated
  - Quick to do
LARMOR

- 40+ motors
- No LabVIEW
- New GUI
GUI mock-up

Dashboard (Seci-like)

Side bar is like Secis, but not permanently visible.
Used for configuration stuff?

"Blocks" as in Seci

Hidden blocks can be shown or hidden quickly
Right-click = context menu for blocks (set limits, show/hide, logging)

The interface must scale with screen size & be touch screen friendly

Synoptic View can be hidden

Sample Stock

Can drill down via Synoptic View
Made up from configurable units

Scan Plot

>> SCAN(<<AXIS>>, -1, 1, 10)
Control System Studio + BOY
Version 2
Current status
Mantid
What went well

• External project manager
  – Different perspective
  – Greater expertise
  – Developers developing
• Scrum
• Pilot project
• lvDCOM
• Incorporating code from outside (mostly)
• Support from other institutes
• Being able to test on a real instrument
What did not go well

- Not enough customer involvement, especially at the beginning
- Sprint demos
- Not everyone comfortable with Scrum
  - Lack of a detailed long term plan can be unsettling
  - Hard to plan your objectives for the year
- Eclipse RCP
  - A steep learning curve
- Too many tickets in a sprint – FIXED!
  - Dodging tickets
- Three week sprints – FIXED!
- Tickets not being reviewed – FIXED?
Thank you