

Controls and Monitoring Status

MICE CM48

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Introduction

- Progress since CM47
 - Summary of C&M during User Cycle 2016/05 (Feb-Mar 2017).
 - Improvements for User Cycle 2017/01 (May 2017).
 - Summary of C&M during User Cycle 2017/01.
- Current status.
 - Summary of improvements to the functionality.
 - Preparations for next data taking run.
 - Outstanding issues.
- Summary.

Summary of User Cycle 2016/05 (Feb-Mar 2017)

- Aim was to stabilise current implementation of the controls software and to fix bugs.
- Bring pro version of the repository up to date and write utility scripts to facilitate separation of development and production environments.
 - Major milestone.
- Move all iocs which were running in dev to pro.
 - All were done except RackMon (because this is connected to the UPSs).
- Archiver
 - The configuration for each system was state dependent.
 - Problematic if the state being transitioned to does not include an important PV.
 - Requires restart of the archiver when states change. Short period when PVs are not archived.
 - Feature was removed. Static configuration implemented which includes all PVs to be archived.
 - State machines still managed to restart the archiver on state transitions causing breaks in archived PV data.
- Many bug fixes but overall running was stable!

Improvements for User Cycle 2017/01 (May 2017)

- Update settings and improve robustness, functionality and maintainability.
- Re-organisation of ALH config files and spreadsheets to facilitate automatic generation of ALH config files and application of alarm limits.
 - Unify naming.
 - Create spreadsheet for environment, services and computing.
 - Consolidate ALH and archiver config files.
 - Avoid manually updating.
 - Makefile to auto-generate ALH and archiver config files and to upload to the CDB from the spreadsheets.
- MOM panel to force a system into a particular state. Fixed design flaw in the state machines and added explicit indicator to the gui. Tested this with the DS with help from Mike Courthold. Pushed changes to all other systems. Documentation for MOM has been written.

The screenshot displays the MOM Control Panel interface, which is divided into two main sections: State Machines and AutoSMS. The State Machines section contains a table with columns for System, State, Manual Selection, and SM Disabled. The AutoSMS section contains a table with columns for System, Reset, Status, and Expert List. At the bottom of the panel, there are controls for SSH access and the MICE State.

State Machines			
System	State	Manual Selection	SM Disabled
BL:	Offline	Offline ▾	YES
TGT:			YES NO
DS:	Powered	SM Enabled ▾	NO
DET:	Offline	SM Enabled ▾	NO
TKU:	Running	Running ▾	YES
TKD:	Offline	Offline ▾	YES
SSU:	Offline	SM Enabled ▾	NO
SSD:	Offline	Offline ▾	YES
FCD:	Offline	Offline ▾	YES

AutoSMS			
System	Reset	Status	Expert List
BL:		No alarms	View
TGT:			View
DS:		No alarms	View
DET:		No alarms	View
TKU:		No alarms	View
TKD:		No alarms	View
SSU:		No alarms	View
SSD:		No alarms	View
FCD:		No alarms	View

SSH open ▾ MICE State: Offline Exit

SSH open Offline ▾

Improvements for User Cycle 2017/01 (May 2017)

- Fixed problem with state machines restarting the Archiver after a state change by changing the port settings used for the Archiver web interface.
- Numerous other bug fixes.
- Tried having all systems in one ALH window.
 - Will make tracking down current alarm much easier but new format will be unfamiliar to shifters.
 - Interface becomes very clunky with many channels in one window.
 - Decided not to use this.
- Updates to spreadsheets with input from system experts.
 - First real test of the whole automated process of uploading spreadsheet data to the CDB, automatically generating ALH and Archiver config files and test that the state machines pick this up.
 - Problem with spreadsheet data having to be hard-coded in the state machines!
 - Problem with ALH filters.

Summary of User Cycle 2017/01 (May 2017)

- C&M was in a “mixed” state.
 - CDB had been updated so new limits were being used but PVs newly included in the spreadsheets were ignored.
 - Parts of the ALH config files were reverted back to make use of the alarm filtering.
 - Many known issues with corrupted read-back.
- SSU state machine was not working.
 - New design that Pierrick was still working on.
 - Was not applying PV limits and silently failing.
- Rewrite of the part of the state machines that apply PV limits.
 - Uses python script instead of state machine notation mixed with C.
 - Allows manually applying limits, verifying information in the CDB and checking limits have been applied correctly.
- Software was frozen so changes not applied to production version.
- Despite these issues data taking was not adversely affected.
 - Channel magnets were not being used.
 - A number of alarms were masked off due to known issues with hardware or alarm limits.

Current Status - Improvements to Functionality

- State machines
 - Now uses python script to set PV limits.
 - No need to hard-code spreadsheet data.
 - All systems updated, almost all have been tested.
 - Discovered design error in the CDB. Discussed with Janusz who will implement a simple fix.
 - Removed functionality to mask off alarms that required hard-coding spreadsheet data.
 - Prevents the SM from disabling alarms automatically.
 - Disabled restarting the Archiver.
- Alarm handler
 - Config files now auto-generated from spreadsheet keeping existing filter settings.
 - Pop-up gui with current value and limits now available for all channels.
- Archiver
 - Static config and fix to state machines means no drop-outs in archiving.

Preparations For Next Data Taking Run

- FC Fast Data Logger.
 - Labview based system maintained by Daresbury.
 - EPICS interface will be updated to allow automatic start of the logger.
 - Craig working on pushing software updates that James Wilson (DL) has made.
 - Current version tested during FC quench test.
 - Issue with signals going to the logger under investigation.
- LH₂ monitoring.
 - Proposal for secure remote monitoring during running with hydrogen more or less accepted by ISIS.
 - Paolo has implemented the hardware solution.
 - Updates to the ioc and gui that Pierrick wrote are in progress.
 - Create spreadsheet to define what PVs will be included in the ALH and Archiver.

Other Outstanding Issues

- Need to fix the way non-numeric PVs (e.g. status bits) are dealt with by the state machines and ALH.
 - Preferred solution is to use numeric copies of the PVs.
 - Need to go through spreadsheets with system experts.
- Updates and bug fixes to the spreadsheets.
- Some of the beam loss information from ISIS is being lost.
- Communications problem with SSU CC1 and CC2.
 - Tested with Craig last week. Not a problem with the cable. Needs further investigation.
- Readout of new Tracker vacuum gauges.
- Communication error messages in ioc log files.
- Widespread CANbus watchdog failure.
 - Detailed discussion with Pete Owens, Craig, Paul H. and myself.
 - Exact cause unknown, still under investigation.
 - Need to review if the way in which equipment shuts down in the event of a failure is safe.

Other Outstanding Issues

- Document MOM/DC procedures for:
 - Start of run
 - Ensure state machines are running and in the correct state.
 - Restart ALH, check and mask off alarms based on the list of known issues.
 - Manual state change of DS after end of run. Agreed with Mike Courthold as safest way to run DS.
- Need to decide how to handle alarms limits for PVs not in current state.
 - These will be in the ALH and will alarm based on last setting.
- A number of small bug fixes and improvements and a fair amount of code clean up that are low priority.
- List of issues following Cycle 2017/01 prepared by Henry. See <http://micewww.pp.rl.ac.uk/projects/operations/wiki/Cycle201701issues>
 - Henry and I reviewed these last week.
 - Many hardware issues to be followed up by system experts.
 - C&M issues
 - Either fixed by recent updates or are in progress.
 - Others require updating alarm limits with input from system experts.

Summary

- Now have consistent and up-to-date development and production environments and well defined procedures for testing and implementing code changes.
 - Stable running.
- Many improvements have been made to the state machines.
 - Overall behaviour is similar but more robust and easier to maintain.
 - Non-essential features that were causing problems were removed.
- Many bugs fixed.
- Still a number of outstanding issues.
 - Many are hardware related.
 - Many issues are low priority given that we only have one more data taking period.
 - Everything that is important will be fixed.