

UCN Data Acquisition

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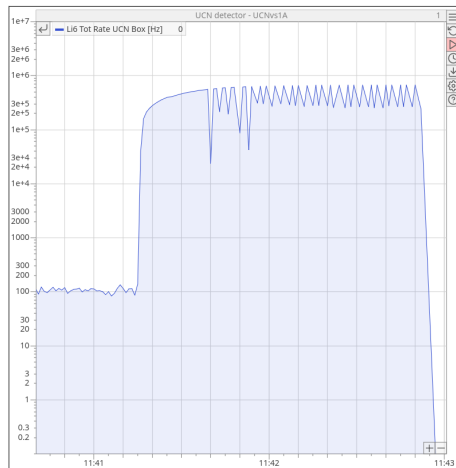
TUCAN
TRIUMF Ultracold
Advanced Neutron
Collaboration

Discovery,
accelerated

Year in Review

Fixes and improvements to DAQ

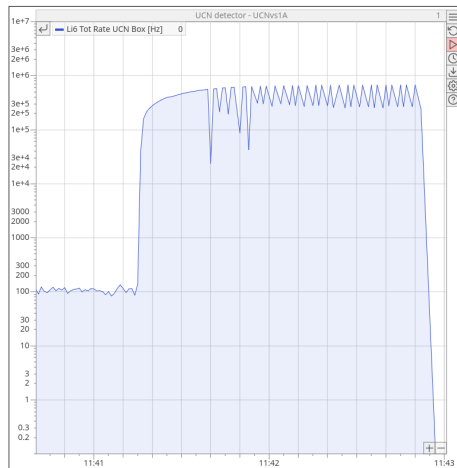
- ^6Li detector data streaming up to ~ 500 kHz [elog]
 - From buffer of 64 packets with 80 hits/packet to 32 packets with 400 hits/packet
 - Data packets still contain some unnecessary waveform samples. If we remove those samples we should hopefully be able to push the maximum sustainable hit rate to ~ 1 MHz



Rates from Jan 21, 2026: ^6Li detector,
no foil, continuous production

Fixes and improvements to DAQ

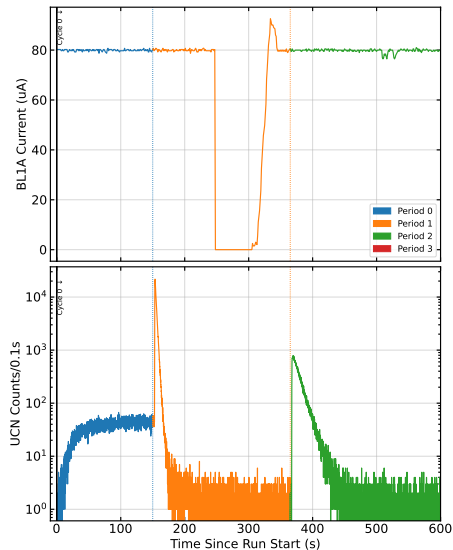
- ^6Li detector data streaming up to ~ 500 kHz [elog]
 - From buffer of 64 packets with 80 hits/packet to 32 packets with 400 hits/packet
 - Data packets still contain some unnecessary waveform samples. If we remove those samples we should hopefully be able to push the maximum sustainable hit rate to ~ 1 MHz
- Fixed history plots losing points in scrolling mode
 - Changed how often the data is flushed to MySQL



Rates from Jan 21, 2026: ^6Li detector,
no foil, continuous production

Fixes and improvements to DAQ

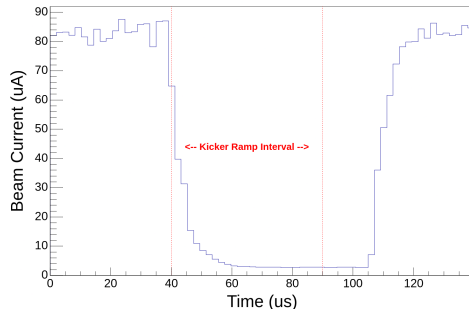
- Precise timings of cycle starts fixed
 - Timing is now synced to KTM beam-on signal plugged directly into the V1725 digitizer



Run 3215, Jan 26, 2026

Fixes and improvements to DAQ

- Precise timings of cycle starts fixed
 - Timing is now synced to KTM beam-on signal plugged directly into the V1725 digitizer
- New KTM display with off-the-shelf CAEN digitizer (with backup module)



New KTM display graph

New and updated MIDAS pages

- Autostat
- Shift scheduler
- Phone notifications
- Liquifier production

Status
Transition
OOD
Messages
Log
Alarms
Programs
History
Help
UCN

Alarms: None 21 Jan 2026, 16:09:52 UTC+8

PID Control Loops

fw_autostart_pid_program is running

Flows					
Program	Controlling	Target	Target Setpoint	Enabled	
PID_TransLineTemp	UCN2-HB-TSAP02-SFPOS	UCN2-HB-TS340-RDTEMPK	86	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_MP101	UCN2-HB-FM101-BDRLOW	UCN2-HB-FM101-BDRLOW	10	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_ConverterInneps PIDs set	UCN2-ISS-MP001-JLWON	UCN2-HB-PMG120-NDRLOW	200	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_XOKShield	UCN2-HB-PVX05-GPS	UCN2-CRV-TS307-RDTEMPK	50	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_I00KSdIag	UCN2-HB-PVQ07-LIFOP	UCN2-CRV-TS306-RDTEMPK	100	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_WatJTemp	UCN2-HB-PVQ08-GPS	UCN2-LD2-TS351-RDTEMPK	100	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_ECLAr	UCN2-HB-PVF026-GPS	UCN2-CRV-TS325-RDTEMPK	40	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Purifier Heaters

Controlling					
Program	Controlling	Target	Target Setpoint	Enabled	
PID_PUL_HET7K	UCN2-HB3-HTR105-CUR	UCN2-CRV-TS110-RDTEMPK	70	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_PUL_ISO7EK	UCN2-ISS-HTR101-CUR	UCN2-CRV-TS112-RDTEMPK	70	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_PUL_HEZ0K	UCN2-ISS-HTR107-CUR	UCN2-CRV-TS111-RDTEMPK	20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
PID_PUL_ISO2KK	UCN2-ISS-HTR102-CUR	UCN2-CRV-TS113-RDTEMPK	20	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Tail Section Heaters

Program	Controlling	Target	Target Setpoint	Enabled	
PID_HT0001	UCN2-ISS-HT001-CUR	UCN2-HB-TS112-RDTEMPK	353	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0003	UCN2-ISS-HT003-CUR	UCN2-ISS-TS019-RDTEMPK	402	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0034	UCN2-ISS-HY004-CUR	UCN2-ISS-TS019-RDTEMPK	397	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0005	UCN2-ISS-HT005-CUR	UCN2-ISS-TS021-RDTEMPK	394	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0006	UCN2-ISS-HT006-CUR	UCN2-ISS-TS022-RDTEMPK	399	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0007	UCN2-ISS-HT007-CUR	UCN2-ISS-TS017-RDTEMPK	353	<input type="checkbox"/>	<input type="checkbox"/>
PID_HT0008	UCN2-ISS-HT008-CUR	UCN2-HB-TS224-RDTEMPK	325	<input type="checkbox"/>	<input type="checkbox"/>

Notes

- T5010 is 30-31 K offset from T5008
- T5011 is 32-33 K offset from T5009
- T5019 is 26-30 K offset from T5012
- T5020 is 26-28 K offset from T5013

Sensor Offsets

Scripts

fw_autostart_script_program is running

Persistent

Set_PID_TransLineTemp

If LVL200 = 85k - 1%**, then set the PID_TransLineTemp setpoint to 100 K.**

If LVL200 = 35k + 1%**, then set the PID_TransLineTemp setpoint to 80 K.**

If PM002 = 40 s/m, open reset FFW if PM002 < 20 s/m, close reset FFW.
If PM002 > 37.8 s/m, averaged over 10 time slots.

Optimize_ShieldFlow

After each opend/closed, wait {60 seconds}. Ignore FFWs with enable of 0. This script does not change the % setpoints, only the opend/close state.

If TS135 > 1.6 K, reset NVT01 by 3% every 30 S.

If NVT01 = 17%, set MP001 as 70 Hz (triggers once per enable).

If TS135 > 3 K or NVT01 = 15%, set MP010 and MP102 to 90 Hz and open GVNT01 and GV102. When TS138 > 1.6 K, reset NVT01 = 1%, MP101, MP102, GV101, GV102.

KneipEXLiquid

If net in auto/HI

If bag LVL205 > 60% and MD LVL204 = 40%, then close CRV201 to 4%.
If bag LVL205 > 75% or MD LVL204 < 40%, then close CRV201.

If in auto/HI, close CRV201.

Average LVL205 over 30 s to remove noise [LVL205] = 36.7%.

FRTkgpass (CONTROLLING PV001)

If LVLVSAM000 indicates that the beam is on, then set HTRG01 to 0 mA. When the beam is off, set HTRG01 to 0 mA. Currents are set when beams is triggered.

Hc Purifier

StopCirculation

Wait until MP001 integrated volume > 52000 SL, ignoring rates < 0.5 SL/min. Protects against overservice and clogging.

StartRecovery

Close circulation path and set heater PID = 20 K.

StopRecovery

When PT004 and PT005 are both < 10 mbar, close AW524 and AW025.

StartRegeneration

CPI off, BP002 on, then wait until CG063 < 6.2 mbar. Wait until MFIs and closed recovery paths. Open AW050 and AW051, set heater PID = 180 K. Wait until T > 90 C or FM028 > 0.5 SL/min.

StopRegeneration

Wait until all four TS > 180 K, and FM028 < 0.25 SL/min, then close AW050, AW051, turn off BP002, and turn off heat heaters.

StartCooling

CPI on, and heater PID setpoints > 70 K.

StopCooling

Wait until T < 70 K.

☐

Queue

Start

On start_run queue from index 0.
At end_run, resume 0 more times.

Script Name

Setpoints and Current Values

New and updated MIDAS pages

- Autostat
- Shift scheduler
- Phone notifications
- Liquifier production

UCI

Status
Transition
OOB
Messages
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Buffers
OldHistory
AutoStat
LiquifierProduction
OnlineDisplay
Pharmaceuty
Quicklinks
Runlog
Sequences2018
Shift Goals
SHIFTSchedule
SourceManual
UCI Counts

Alarms: None 27 Jan 2020, 16:06:41 UTC-8

Shift Assignments

On shift now: Alexis Brossard, Charles Mao, Tahereh Mohammadi

Viewing: 01 / 22 / 2020 to 02 / 04 / 2020 Last Week Today Next Week 1wk 2wk 3wk

Assign shifters with role: Highlight cells:

☒ Shifts may only be assigned to available shifters

	Thursday Jan 22	Friday Jan 23	Saturday Jan 24	Sunday Jan 25	Monday Jan 26	Tuesday Jan 27	Wednesday Jan 28	Thursday Jan 29	Friday Jan 30	Saturday Jan 31	Sunday Feb 1	Monday Feb 2	Tuesday Feb 3	Wednesday Feb 4
Notes	beam	beam	beam	beam	beam	beam	beam	beam	beam	warm up	warm up	warm up		
GRS 13:00-17:30	Kate Dong (Exp) Noah Vazandoust (Cryo)	Mark McCrea (Remote Cryo) Noah Vazandoust (Exp)	Derek Fujimoto (Cryo) Ryuto Fujitani (Exp)	Derek Fujimoto (Cryo) Ryuto Fujitani (Exp)	Derek Fujimoto (Cryo) Ryuto Fujitani (Exp)	Derek Fujimoto (Cryo) Ryuto Fujitani (Exp)	Derek Fujimoto (Cryo) Takashi Higuchi (Cryo)	Ryuto Fujitani (Exp) Takashi Higuchi (Cryo)	Ryuto Fujitani (Exp) Takashi Higuchi (Cryo)	Takashi Higuchi (Cryo)	Mark McCrea (Remote Cryo)			
GRV 07:00-10:30	Dew Chiba (Cryo)	Eric Miller (Cryo)	Jeff Martin (Cryo)	Dew Chiba (Cryo) Jeff Martin (Exp)	Jeff Martin (Cryo)	Dew Chiba (Cryo)	Abeer Zahra (Cryo)	Abeer Zahra (Cryo)	Abeer Zahra (Cryo) Amala Janson (Exp)	Dew Chiba (Cryo)	Dew Chiba (Cryo)			
SVL 13:00-23:30	Charles Mao (Cryo) Ryuto Fujitani (Exp)	Charles Mao (Cryo) Dennis Salazar (Exp)	Dennis Salazar (Exp) Wolfgang Kasten (Cryo)	Dennis Salazar (Exp) Tahereh Mohammadi (Cryo)	Chris Ye (Exp) Tahereh Mohammadi (Cryo)	Chris Ye (Exp) Tahereh Mohammadi (Cryo)	Amala Janson (Cryo) Russell Mammeli (Exp)	Amala Janson (Cryo) Russell Mammeli (Exp)	Charles Mao (Cryo) Russell Mammeli (Exp)	Chris Ye (Cryo)	Rylan Stutters (Cryo)			
Run Coordinator	Alexis Brossard	Alexis Brossard	Alexis Brossard	Alexis Brossard	Alexis Brossard Noah Vazandoust	Noah Vazandoust	Noah Vazandoust	Noah Vazandoust Sean Vanbergen	Sean Vanbergen	Sean Vanbergen	Sean Vanbergen	Sean Vanbergen		

Set availability for:

	Thursday Jan 22	Friday Jan 23	Saturday Jan 24	Sunday Jan 25	Monday Jan 26	Tuesday Jan 27	Wednesday Jan 28	Thursday Jan 29	Friday Jan 30	Saturday Jan 31	Sunday Feb 1	Monday Feb 2	Tuesday Feb 3	Wednesday Feb 4
Notes	beam	beam	beam	beam	beam	beam	beam	beam	beam	warm up	warm up	warm up		

New and updated MIDAS pages

- Autostat
- Shift scheduler
- Phone notifications
- Liquifier production

The screenshot shows the UCN MIDAS web interface. The top navigation bar includes a hamburger menu icon, the text 'UCN', and a status indicator 'Alarms: None' with a timestamp '27 Jan 2020, 16:06:19 UTC-8'. A left sidebar contains a list of navigation links: Status, Transition, OOB, Messages, Blog, Alarms, Programs, History, Help, Buffers, OldHistory, AutoStat, LiquifierProduction, OnlineDisplay, **PhoneNotify** (highlighted), QuickLinks, Runlog, Sequence2018, Shift Goals, ShiftSchedule, SourceManual, and UCN Counts. The main content area is titled 'Phone Notifications' and contains the following sections:

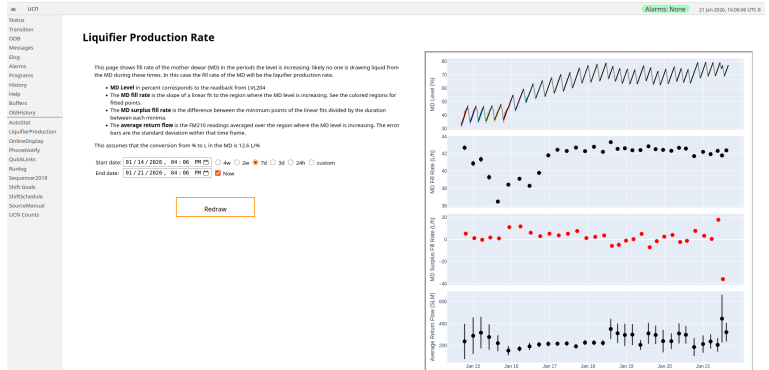
- Phone Notifications**
In the case of a MIDAS alarm, a phone call will be placed to:
On-shift shifters: Run Coordinator Alexis Brossard after 5 mins
EVE 15:00-23:30 Charles Mao after 1 mins
EVE 15:00-23:30 Tahereh Mohammadi after 1 mins
Last resort: after 15 mins
If the alarm hasn't been reset before then.
- Setup and Testing**
The call will originate from +1 226-458-8892. Please enter this as a contact in your phone, and make sure the call will bypass the do not disturb on your phone.
Please test that the script works the first few times you use this system. Note that the test uses the same timings as defined at the top of this page.
The following is a full test: it will activate a **test alarm** which then should trigger the notify system to call shifters with the above timings.

You can also test that you are able receive calls without activating any alarms:
- Emergency Contacts**
Please use the counting room phone with 81 to dial out.
Ruediger Picher (cell) 604-323-0820
Ruediger Picher (home) 604-484-1830
Alexis Brossard 613-328-9547
Sean Vanbergen 250-218-8091
Eric Miller 778-888-5106
Derek Fujimoto 778-873-0054

At the bottom of the page, the URL `daq01.ucn.rikmf.ca/cmd=custom&page=PhoneNotify` is displayed.

New and updated MIDAS pages

- Autostat
- Shift scheduler
- Phone notifications
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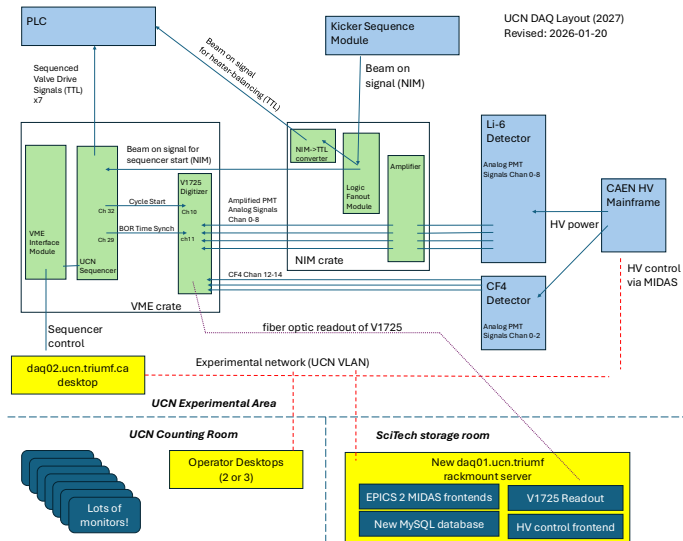


New Updates and Improvements

Network layout

New daq01 machine: Supermicro server preferred by DAQ group not available. Options:

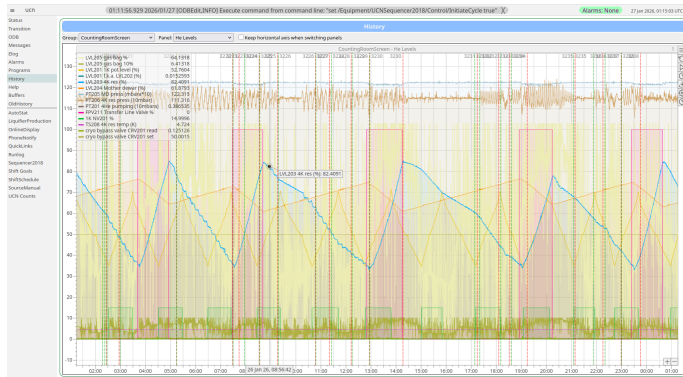
- DAQ could try to spec a new server from Gigabit, purchasing with DAQ funds. If it proves viable we could sell it to UCN. Timeline uncertain.
- Use a new desktop for the next 2-3 years. Not as reliable or as easy to service.



History

Planned updates:

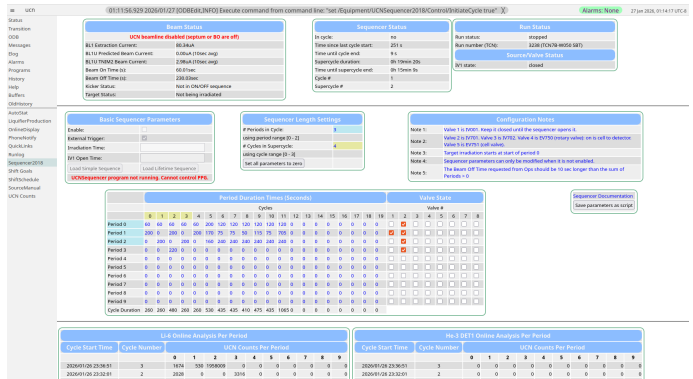
- Reorganize variables by subsystem (HE4, HE3, ISO, etc)
- Add missing EPICS variables
- Remove delays for adding variables to MySQL database (with foresight to EDM subsystems)



Sequencer

Planned updates:

- Re-write for stability, handle long runs
- Some wishlist items:
 - Checkboxes to skip specific cycles
 - Start button on sequencer page
 - Flexible number cycles/periods/valves
 - Better valve ids



Discussion points:

- Improvements to data streaming, timings
- MIDAS pages: Autostat, shift scheduler, notifications, liquifier
- Network changes
- New daq01 machine
- History improvements
- Sequencer improvements
- Integrating EDM subsystems into MIDAS

