TRIUMF

UCN Data Acquisition

D. Fujimoto

T. Lindner

2026-02-17

TUCAN
TRIUMF Ultracold
Advanced Neutron
Collaboration

Discovery,
accelerated
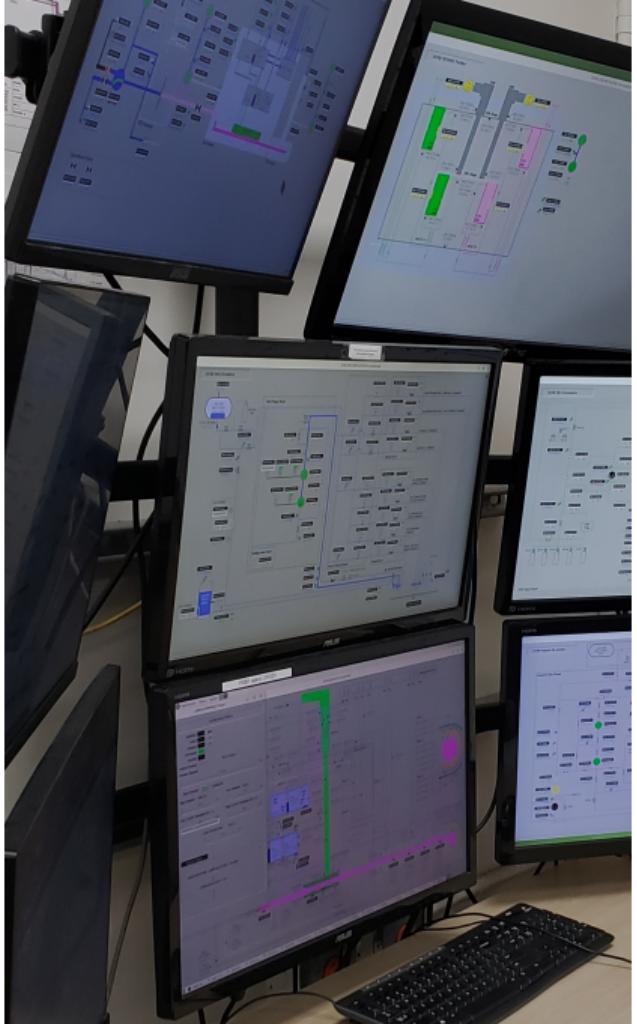
# Year in Review

Fixes and improvements to DAQ

→ ^{6}Li 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: ^{6}Li detector, no foil, continuous production

Fixes and improvements to DAQ

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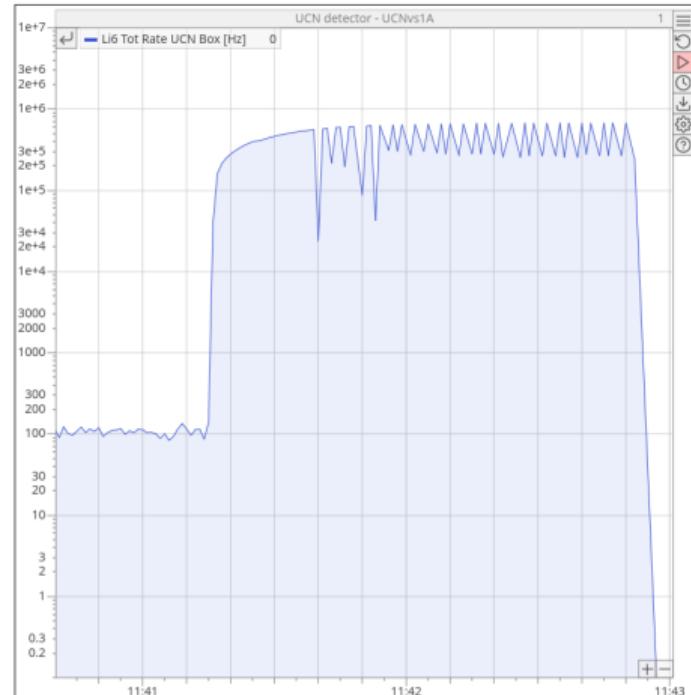
Rates from Jan 21, 2026: ^{6}Li detector, no foil, continuous production

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
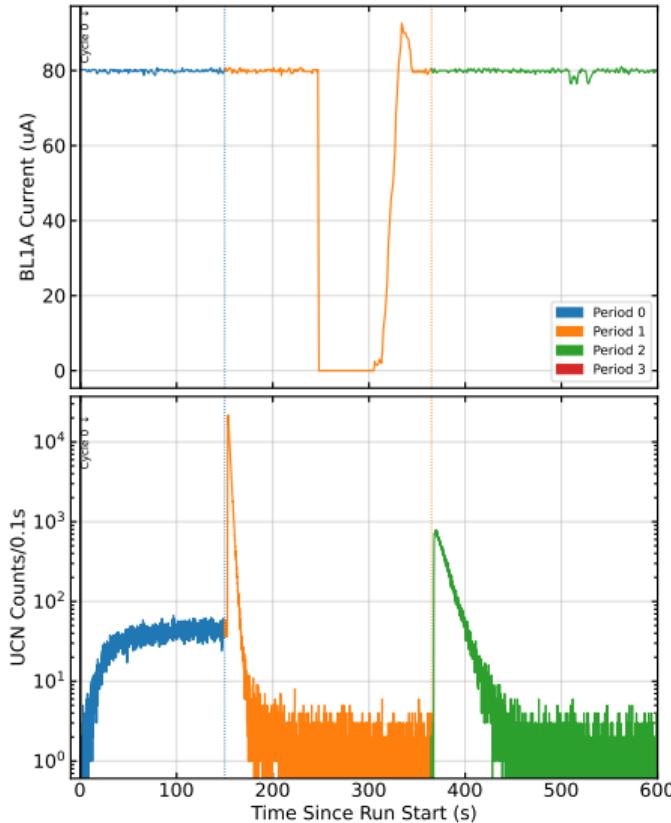
Run 3215, Jan 26, 2026

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)
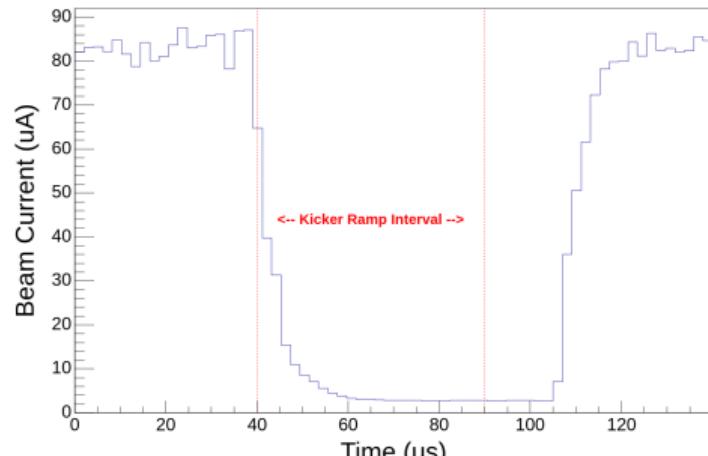
New KTM display graph

New and updated MIDAS pages

→ Autostat

→ Shift scheduler

→ Phone notifications

→ Liquifier production

New and updated MIDAS pages

→ Autostat

→ Shift scheduler

→ Phone notifications

→ Liquifier production

New and updated MIDAS pages

- → Autostat
- → Shift scheduler
- → Phone notifications
- → Liquifier production

New and updated MIDAS pages

→ Autostat
→ Shift scheduler
→ Phone notifications
→ Liquifier production

New Updates and Improvements

Network layout

Planned updates:

→ Replace daq01 with rack-mounted machine

→ Decommission daq02, send data directly to daq01 via fiber optic + USB

→ Remote control of ^{6}Li detector HV

→ No new digitizer needed (16 channels)
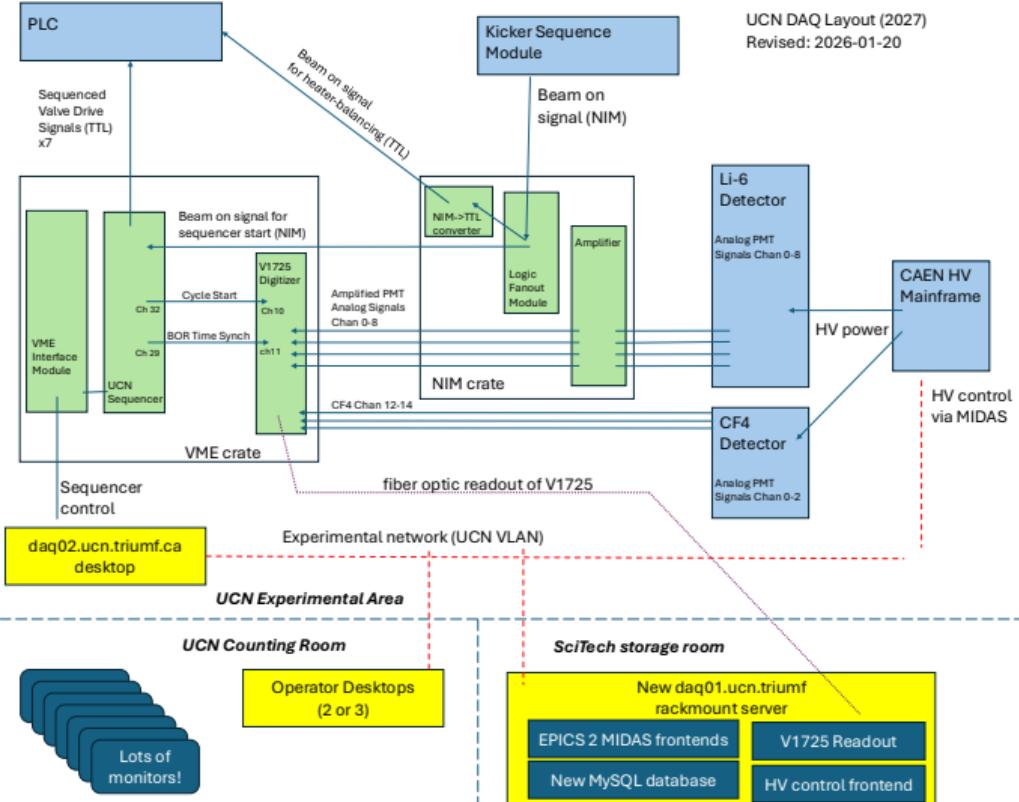
Network layout

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.
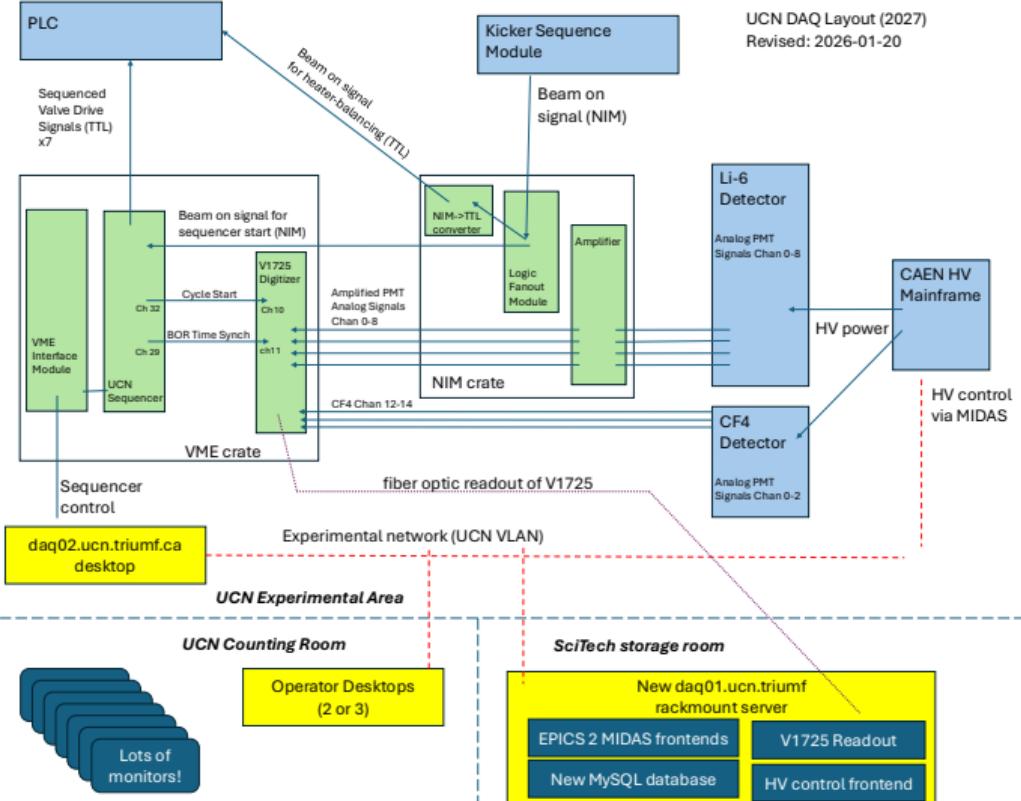
History

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)
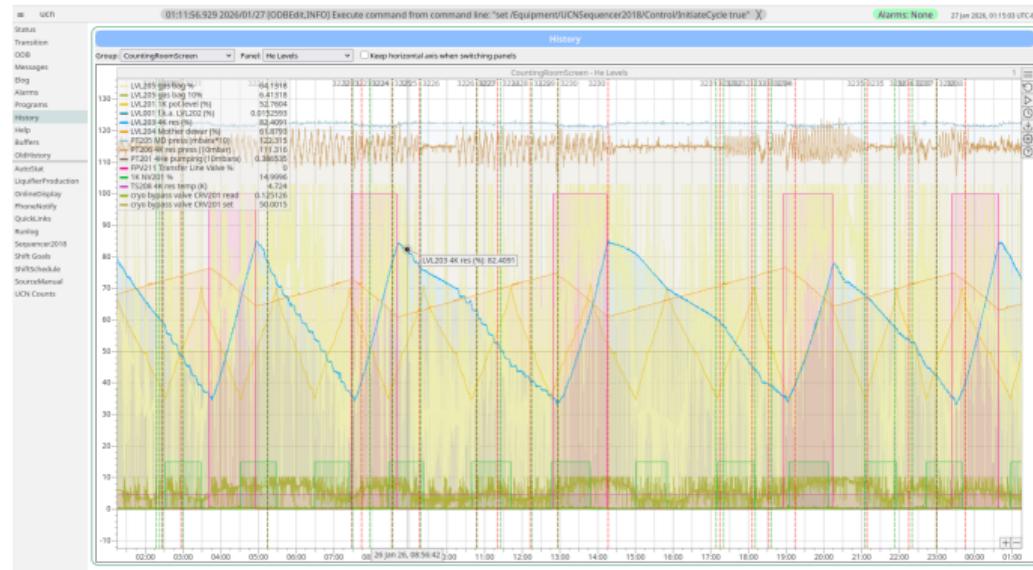
Sequencer

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

TRIUMF

Disucssion 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

Discovery, accelerated