NOvA Experiment Status

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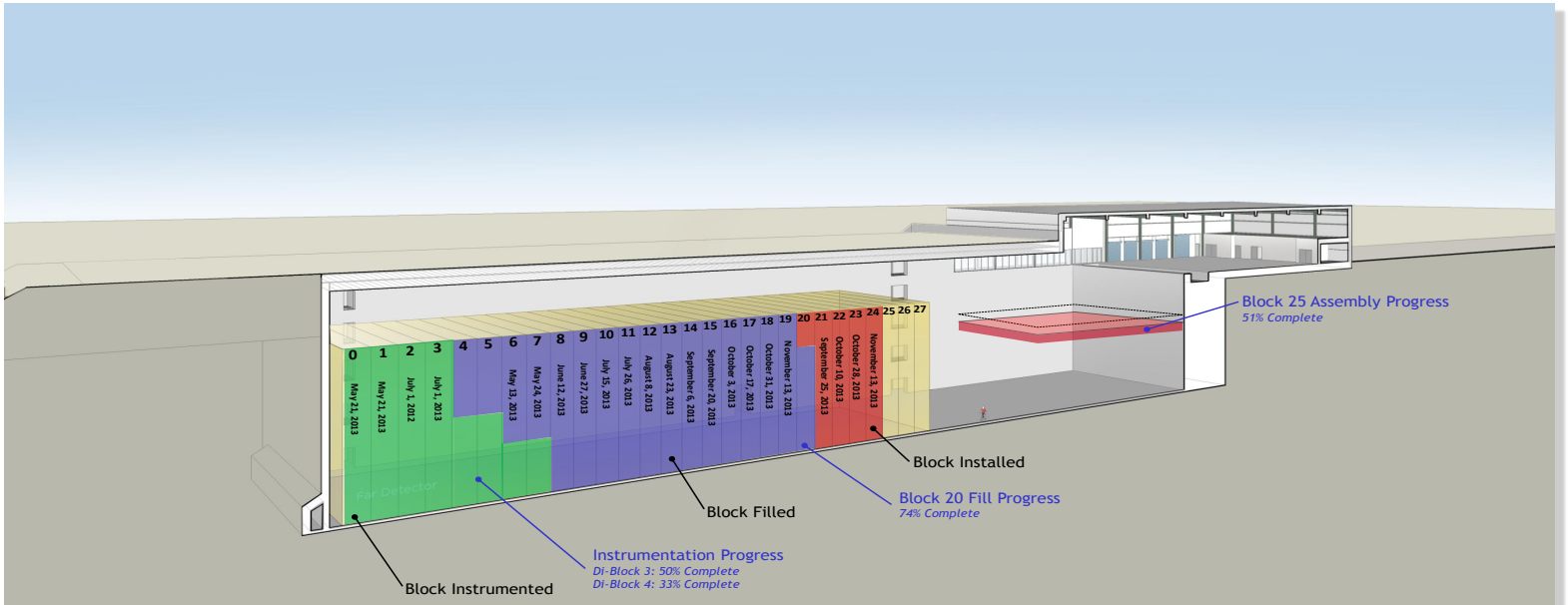
All Experimenter's Meeting, November 25, 2013

Far Detector Construction

The Intensity Frontier

NOvA Far Detector Assembly Progress

Status Date: 25NOV13



14 kilotons = 28 NOvA Blocks

25 blocks of PVC modules are assembled and installed in place

20.74 blocks are filled with liquid scintillator

5.66 blocks are outfitted with electronics

FarDet Outfitting Progress

Di-Block Status (11/25/13)

Di-Block Outfitting Status

Position	DiBlock 14	13	12	11	10	9	8	7	6	5	4	3	2	1	
1			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Install	APD Avail	APD Avail	APD Avail	Vertical
2			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Install	APD Avail	APD Avail	APD Avail	
3			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	APD Avail	APD Avail	
4			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	APD Avail	APD Avail	
5			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	APD Avail	APD Avail	
6			DCM Avail	Filling	FEB Install	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	APD Avail	APD Avail	
7	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	Horizontal
8	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
9	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
10	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
11	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	
12	DCM Avail	DCM Avail	DCM Avail	Filling	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	FEB Avail	APD Avail	APD Avail	

Block Installation Status

	Block 27	26	25	24	23	22	21	20	19	18	17	16	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Status				Set	Set	Set	Set	Filling	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled	Filled

Filling

Filling block 20 (21st block) verticals.

Monday (11/25):

Install APDs for DCM-04-02

Tuesday (11/26):

Install APDs for DCM-04-01

Block 21

Vertical Modules

Position	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3	1
0	Thursday day 12/12/13		Wednesday eve 12/11/13		Wednesday day 12/11/13		Tuesday eve 12/10/13		Tuesday day 12/10/13		Monday eve 12/9/13		Monday day 12/9/13		Friday day 12/6/13	
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																

Horizontal Modules

Position	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
11																
10	Thursday eve 12/5/13															
9																
8	Thursday day 12/5/13															
7																
6	Wednesday eve 12/4/13															
5																
4	Wednesday day 12/4/13															
3																
2	Tuesday eve 12/3/13															
1																
0	Tuesday day 12/3/13															

Thursday eve 12/2/13

Friday day 12/13/13

Block 20

Vertical Modules

Position	31	29	27	25	23	21	19	17	15	13	11	9	7	5	3	1
0	Tuesday eve 11/26/13		Tuesday day 11/26/13			Monday eve 11/25/13	251	251	250	249	249	249	251	252	251
1							51	249	252	251	250	250	251	251	251
2							250	251	251	251	252	250	251	251	252
3							47	250	248	254	248	250	250	252	252
4							251	252	252	247	250	250	251	253	252
5							54	251	252	252	252	250	249	251	252
6							251	250	249	253	249	250	251	250	251
7							33	252	251	252	253	250	253	252	250
8							249	249	250	251	253	250	251	251	250
9							58	249	250	250	251	253	250	251	251
10							249	250	252	251	250	251	251	253	251
11							60	251	250	251	251	251	250	250	251

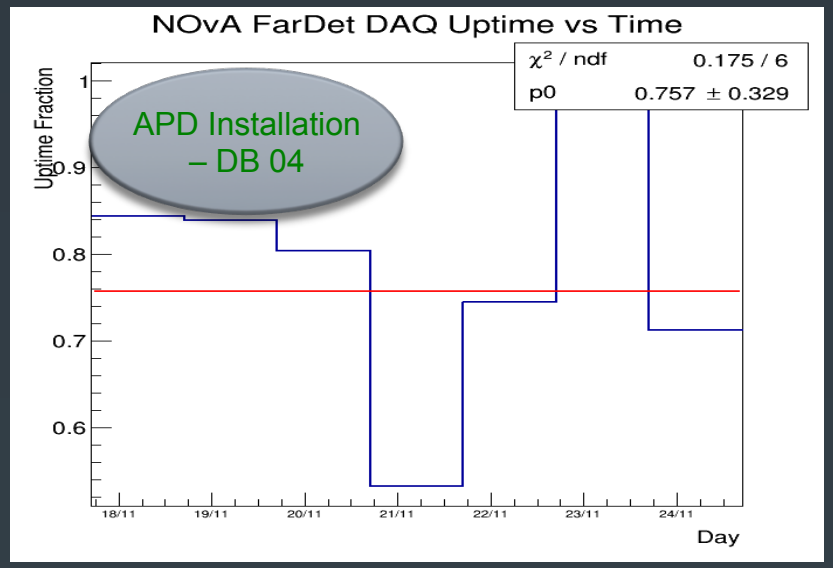
Horizontal Modules

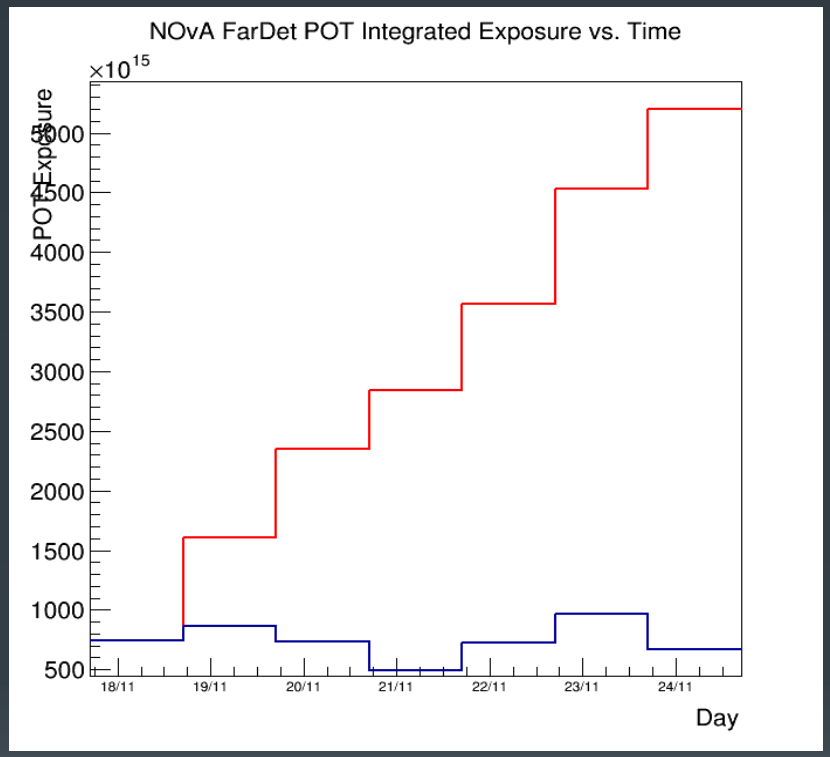
Position	30	28	26	24	22	20	18	16	14	12	10	8	6	4	2	0
11	246	251	250	241	249	233	237	241	239	246	232	239	244	240	245	244
10	245	247	240	244	246	245	246	244	250	247	247	247	245	241	248	239
9	251	248	241	246	243	251	249	248	248	247	247	247	252	246	247	243
8	245	248	247	246	243	246	247	247	247	248	248	246	246	249	249	248
7	242	247	248	248	248	250	246	246	244	246	246	248	247	247	249	247
6	246	245	246	249	247	253	246	242	244	242	247	244	247	249	247	241
5	249	247	243	246	243	247	250	246	244	244	247	247	246	247	249	247
4	246	83	246	248	246	244	245	245	245	246	244	245	246	247	247	101
3	244	244	246	249	246	248	248	243	245	243	245	245	242	247	248	248
2	245	245	249	246	244	248	244	248	244	243	246	243	240	244	251	243
1	250	242	248	246	248	237	245	245	240	231	244	228	238	226	247	245
0	243	243	249	247	243	251	244	247	249	245	248	246	242	243	251	247

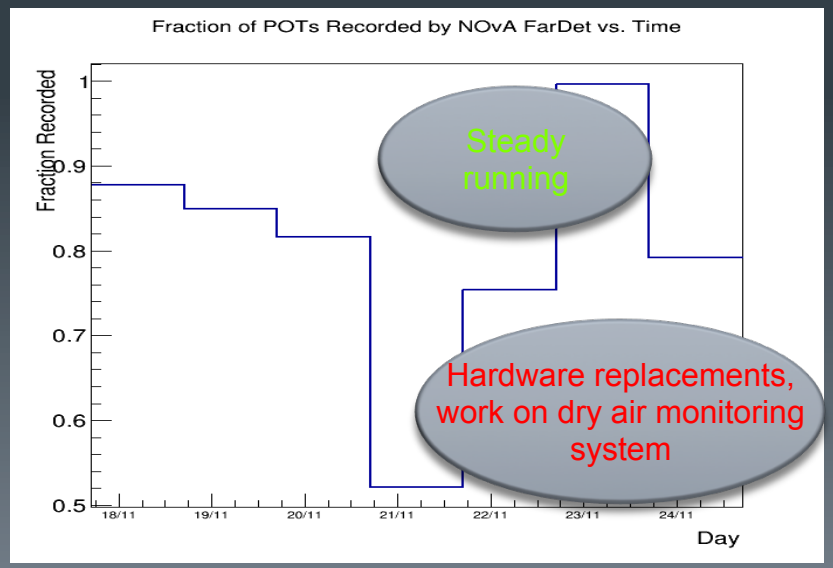
Monday day 12/2/13

Monday eve 12/2/13

FarDet performance past week







- Very reliable, continuous running on weekends
- New APD installation weekdays interrupts DAQ
- Weekday hardware replacements also stops DAQ
- Weekly POT accumulation ~5.2E18

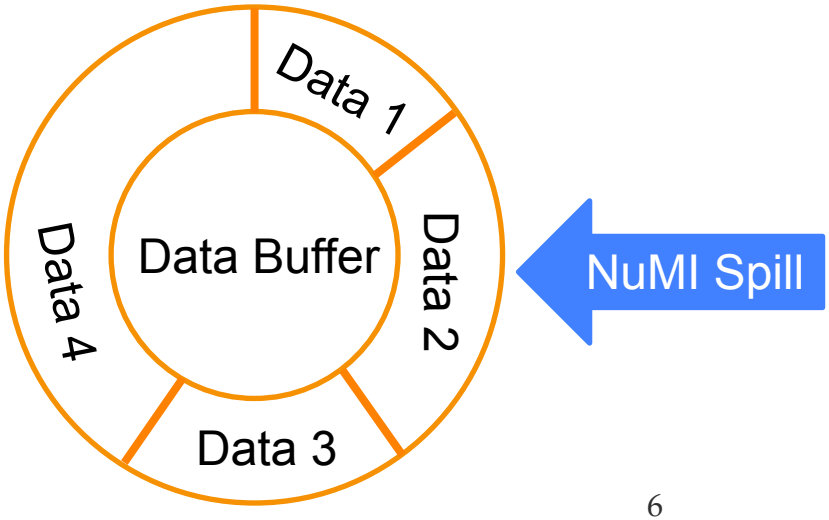
Near Detector Schedule

News and Schedule

- Block #7 in MSB now
  Being surveyed today. Install Tuesday/Wednesday
- Block #8 assembly to start next week Dec 2
  ~8 good modules now in CDF; need 64+ from module factory – asking 5 spares?
  Module delivery next week: 22 ready to be shipped
- Assembly table modification to start Dec 2
- PDB/DCM installation for last di-block to start Dec 2
  All PS in hands – ready to ask ORC for 3rd rack now?
  DCM bundled cable news? DAQ cluster repurposing news?
- APD dryer installation under way
- Venting installation to start next week on PVC blocks
  Finished tubes to be shipped this week -- vent tree assemble to resume?
  Need to order waster collection drum/bucket
- FNAL tanker needs to be moved to MSB ASAP
  Many pieces need to be checked out
- Waiting NDOS test before installing FEB5 on muon catcher - 3rd week of Dec?

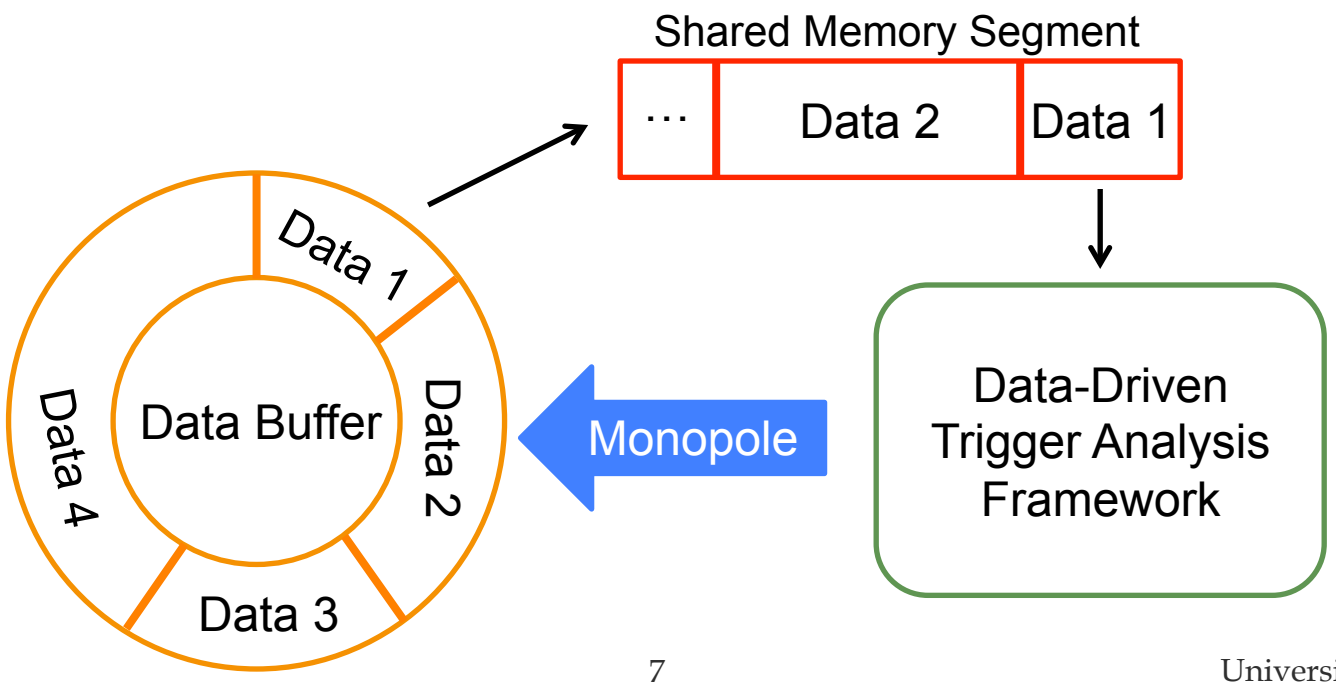
Trigger Introduction

- NO*ν*A's standard triggers are:
  - NuMI
  - Booster
  - Cosmic Pulser (10 Hz)
- The triggers are issued using time stamps.
- The data buffer ring is filled with data from the detector and when a spill is registered, the corresponding data is selected and read out.



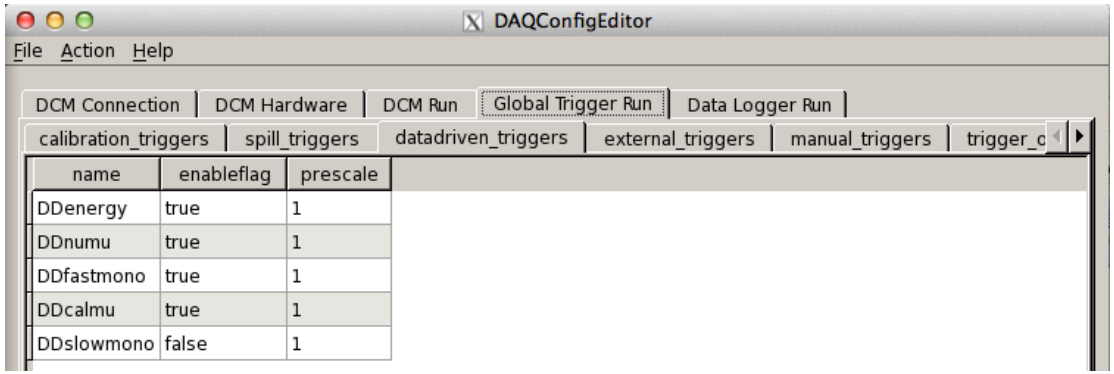
Trigger Introduction

- Some of NO*ν*A's data-driven triggers (DDT) are:
  - Monopole
  - High Energy
  - Supernova
  - Muon Neutrino (contained, upward going)
  - Electron Neutrino
  - Calibration
- The triggers are issued based on fast analysis of the data.
- The data is placed into a shared memory segment, analyzed and triggered.

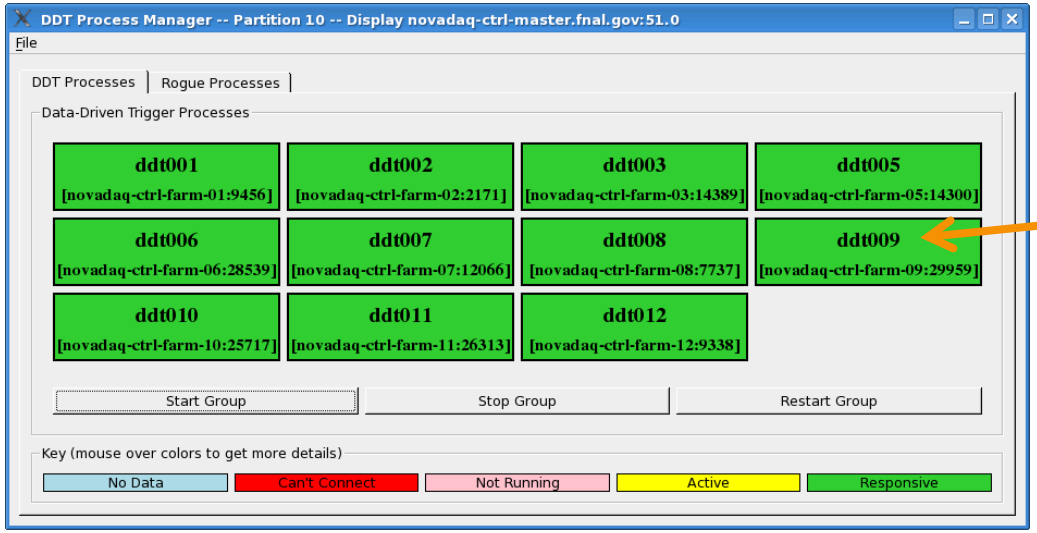


Trigger Tools for Shifters

- We had our first shifter-operated trigger run Friday, 15 Nov!
- We have designed DB tools to configure parts of the trigger:

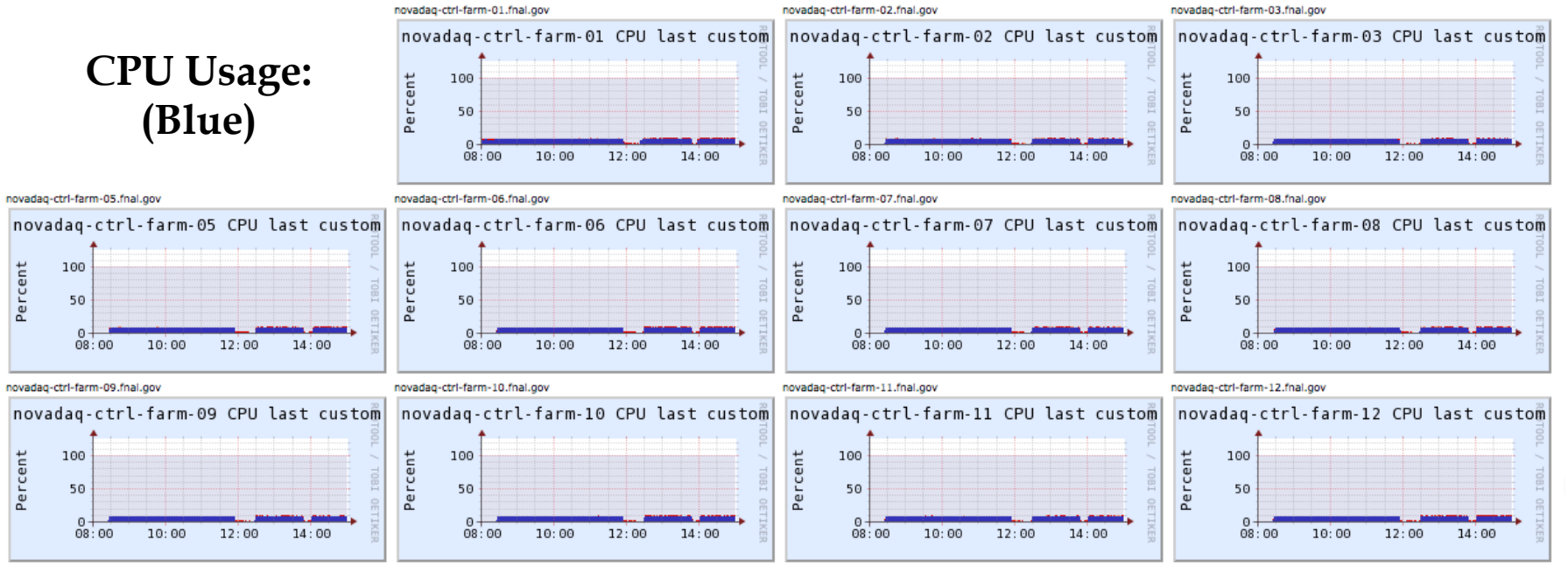


- We also have tools to control the trigger processes:



on all 11 data-processing nodes

CPU Usage: (Blue)



Memory Usage: (Blue)

Dropped Events

time period

Farm Node	1h 22m	1h 36m	1h	1h	1h	1h
1	131	55	0	0	57	0
2	48	82	0	27	116	0
3	2	52	12	0	79	0
5	3	53	0	33	70	18
6	180	51	0	0	70	0
7	62	71	30	0	71	0
8	35	63	2	0	71	0
9	150	54	0	0	70	0
10	4	53	0	17	76	0
11	17	54	0	0	82	0
12	90	51	18	0	70	0

number of events dropped during time period

Dropped Events

time period

Farm Node	1h 22m	1h 36m	1h	1h	1h	1h
1	131	55	0	0	57	0
2	48	82	0	27	116	0
3	2	52	12	0	79	0
5	3	53	0	33	70	18
6	180	51	0	0	70	0
7	62	71	30	0	71	0
8	35	63	2	0	71	0
9	150	54	0	0	70	0
10	4	53	0	17	76	0
11	17	54	0	0	82	0
12	90	51	18	0	70	0

number of events dropped during time period

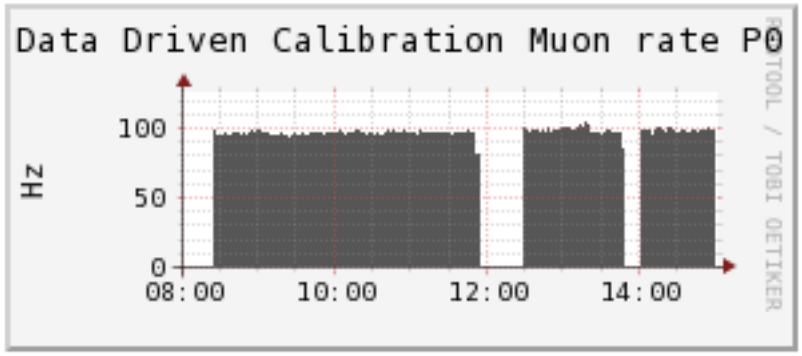
percentage of total time missed (1 event = 5 ms)

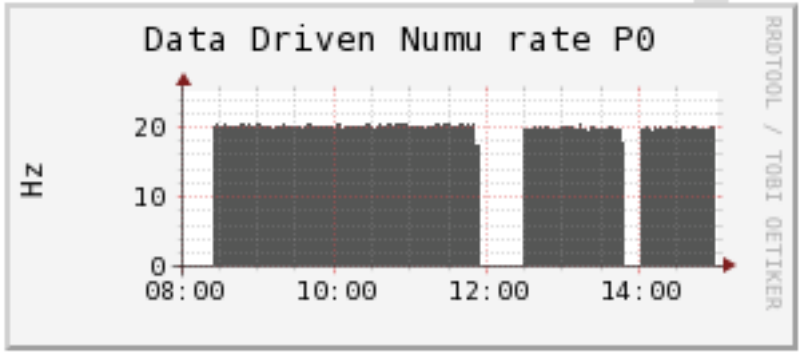
Farm Node						
1	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
2	0.00%	0.01%	0.00%	0.00%	0.02%	0.00%
3	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
5	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
6	0.02%	0.00%	0.00%	0.00%	0.01%	0.00%
7	0.01%	0.01%	0.00%	0.00%	0.01%	0.00%
8	0.00%	0.01%	0.00%	0.00%	0.01%	0.00%
9	0.02%	0.00%	0.00%	0.00%	0.01%	0.00%
10	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
11	0.00%	0.00%	0.00%	0.00%	0.01%	0.00%
12	0.01%	0.00%	0.00%	0.00%	0.01%	0.00%
Total	0.07%	0.06%	0.01%	0.01%	0.12%	0.00%

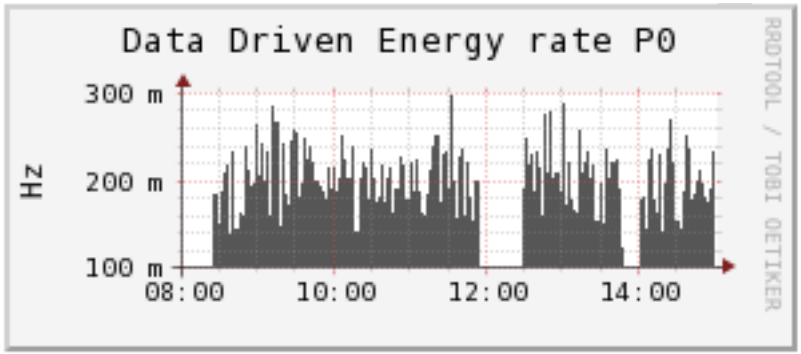
We barely drop anything!

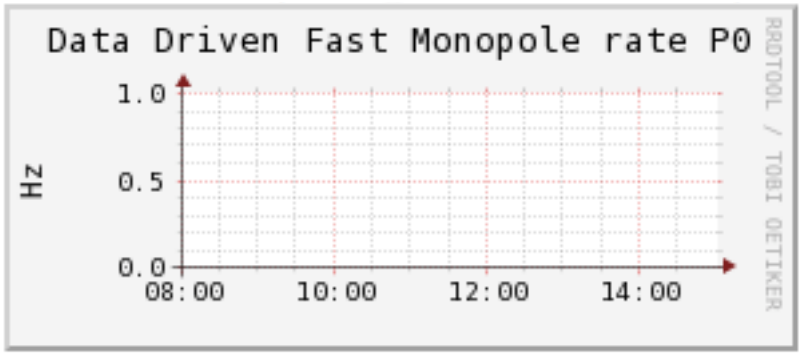
Trigger Rates

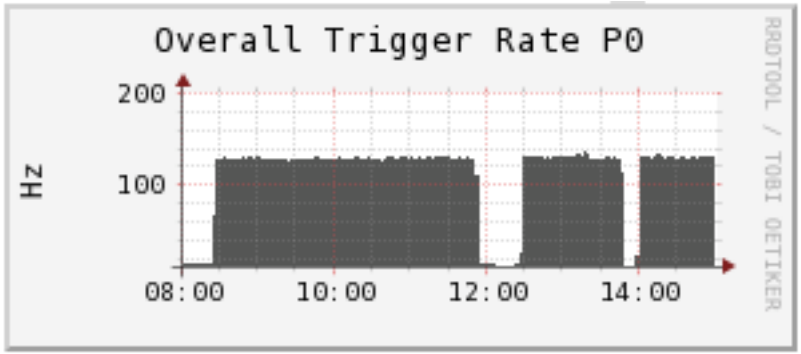
- Here are some trigger rates from Friday's run:











Summary

- NDOS Prototype running smoothly, useful for testing software/firmware/monitoring upgrades before rolling out at FarDet
  - Dedicated DCM for testing new FEBs for Near Detector
  - NDSBTest (Near Detector Surface Building Test) 30 APD test stand for cooling/monitoring tests of APDs
- FarDet – 2.5 diblocks running cold at full gain – very smooth running, 25th block (out of 28) in place – new APD installation ongoing – very good initial performance of APDs w/o A174 primer
- NearDet – 6/8 of the Near Detector blocks are in place – finish in early January 2014, scintillator filling to start immediately after