



Ash River Detector Outfitting Status and Plans

R.J. Tesarek

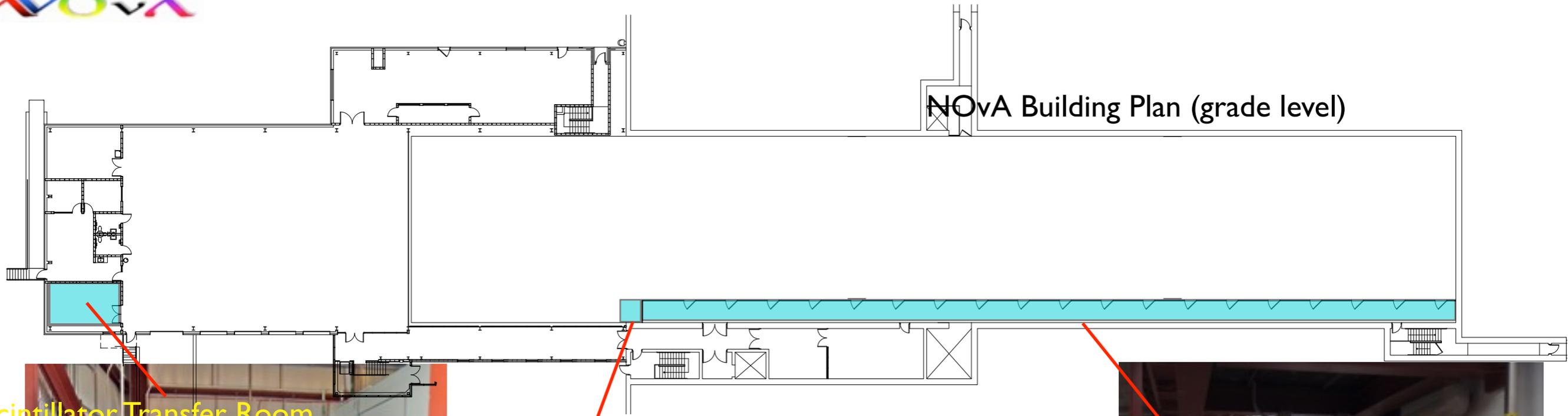
NOvA Deputy Project Manager

Program Management Group Meeting

8/30/12



Infrastructure: Scintillator Distribution



NOvA Building Plan (grade level)

Scintillator Transfer Room



Scintillator QA Lab



Scintillator Distribution Controls (Detector Floor Level)

Scintillator Distribution Plumbing (LL3)

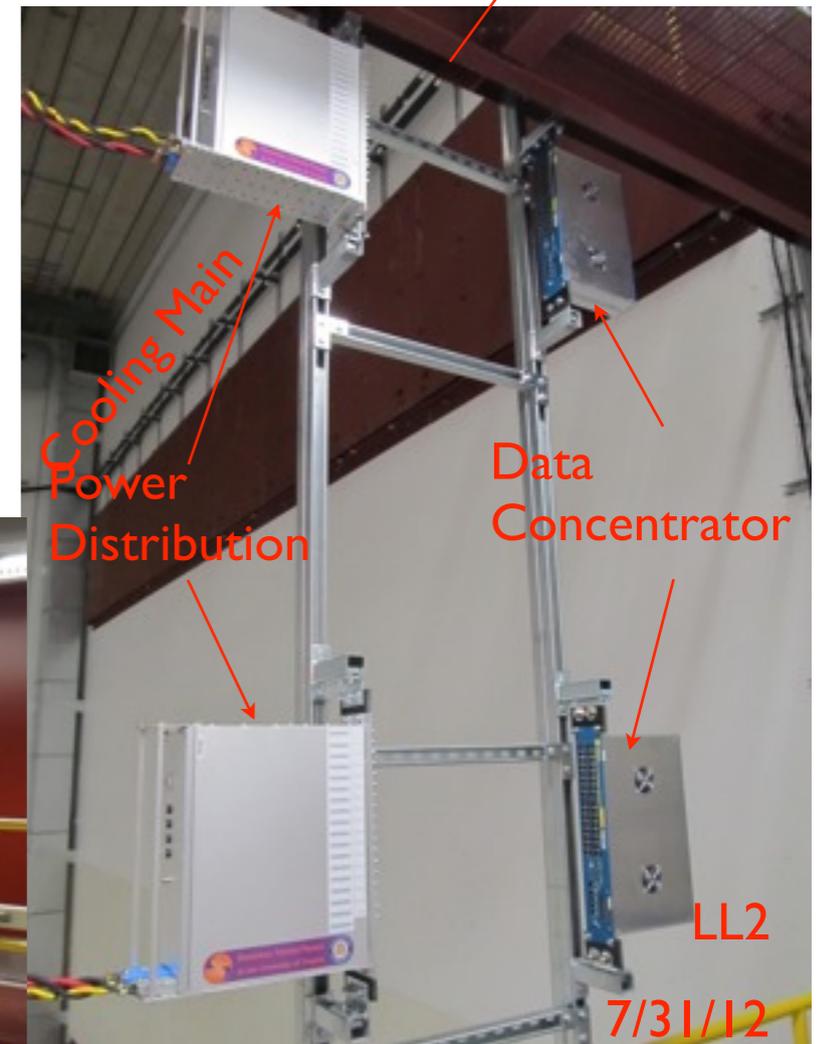
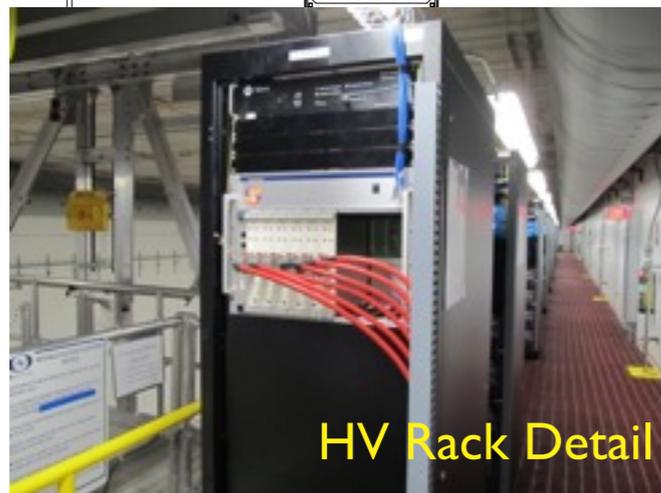
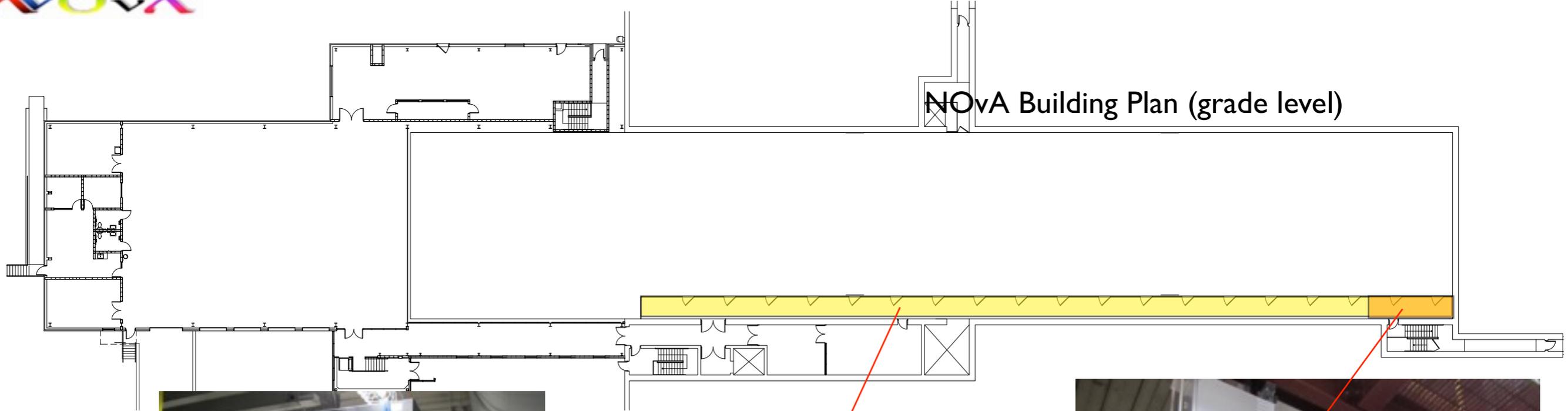


Scintillator Fill Machines





Infrastructure: Detector





Detector Rack Status

HV Racks

Detector Racks Include the following infrastructure:

- Network connections
- Power supplies for on-detector electronics/sensor bias
- Timing for the readout
- Rack monitoring (temperature, air flow)
- Detector structural monitors (strain gages, proximity sensors, etc)

Status (equipment):

- 15 LV racks 94% complete (example rack done)
 - ➔ May need to install air plenums to re-direct heat from LVPS
- 2 HV racks 89% complete
- 2 Network racks 97% complete
 - ➔ Patch cables on order (~300 cables to be installed)
 - ➔ Need 2 network switches to complete cabling

Equipment	Equipment Serial Number by Rack (Rack Front)	
	LLODHRR04N	LLODHRR12N
Rack Protection Monitor	RPII-17	RPII-18
Blank panel (3U)	installed	installed
Wiener MPOD HV Mainframe	2789048	2789046
Blank panel (9U)	installed	installed
DCS Sensor Crate #1	Installed	
Blank Panel (5U)	installed	installed
Block Structure Crate #1		
120V Power Interrupt	120 PDC17	120 PDC18
HV Patch Panel #6	UVA HVP-001	UVA HVP-007
HV Patch Panel #5	UVA HVP-002	UVA HVP-008
HV Patch Panel #4	UVA HVP-003	UVA HVP-009
HV Patch Panel #3	UVA HVP-004	UVA HVP-010
HV Patch Panel #2	UVA HVP-005	UVA HVP-011
HV Patch Panel #1	UVA HVP-006	UVA HVP-012

Detector Network Racks

Equipment	Equipment Serial Number by Rack (Rack Front)	
	LLODHRR05N	LLODHRR13N
Rack Protection Monitor	RPII-19	RPII-20
120V Power Interrupt	120PDC-20	120PDC-19
Cable Management	Installed	Installed
DCS2960 Switch	119398	119392
Cable Management	Installed	Installed
DCS2960 Switch	119396	119393
Cable Management	Installed	Installed
DCS2960 Switch	119397	119394
Cable Management	Installed	Installed
DCS2960 Switch		
Cable Management	Installed	Installed
DAQ 4948 Switch	119405	119401
Cable Management	Installed	Installed
DAQ 4948 Switch	119407	119404
Cable Management	Installed	Installed
PoE Camera Switch	ET1124S800311	ET1124S800315
Cable Management	Installed	Installed
Patch Panel 8	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 7	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 6	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 5	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 4	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 3	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 2	Installed	Installed
Cable Management	Installed	Installed
Patch Panel 1	Installed	Installed
Cable Management	Installed	Installed
Cable Management	Installed	Installed

LV Racks

Equipment	Equipment Serial Number by Rack (Rack Front)															
	LLODHRR02S	LLODHRR03S	LLODHRR04S	LLODHRR05S	LLODHRR06S	LLODHRR07S	LLODHRR08S	LLODHRR09S	LLODHRR10S	LLODHRR11S	LLODHRR12S	LLODHRR13S	LLODHRR14S	LLODHRR15S	LLODHRR16S	
Rack Protection Monitor	RPII-2	RPII-3	RPII-4	RPII-5	RPII-6	RPII-7	RPII-8	RPII-9	RPII-10	RPII-11	RPII-12	RPII-13	RPII-14	RPII-15	RPII-16	
Patch Panel	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Cable Management	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Patch Panel	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
TDU	557347(02)	557348(03)	557349(04)	557350(05)	557351(06)	557352(07)	557353(08)	557354(09)	557355(10)	557356(11)	557357(12)	557358(13)	557359(14)	557360(15)	557361(16)	
TDU	557362(17)	557363(18)	557380(35)	557379(34)	557378(33)	557377(32)	557376(31)	557373(28)	557375(30)	557374(29)	557384(39)	557383(38)	557381(36)	557382(37)	557385(40)	
Blank	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Blank	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Block Structure crate #1	Installed															
Blank	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
fan tray	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Wiener PL506 #4	2389022	3089031	2389010	3089010	2389013	2389019	3089034	2389003	3089042	3089028	3089033	3089045	3089041	3089038		
240V Power Interrupt #4	240 PDC-02	240 PDC-06	240 PDC-10	240 PDC-14	240 PDC-18	240 PDC-22	240 PDC-26	240 PDC-30	240 PDC-34	240 PDC-38	240 PDC-42	240 PDC-46	240 PDC-50	240 PDC-54	240 PDC-58	
fan tray	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Wiener PL506 #3	2389011	3089016	2389008	3089037	3089088	2389004	3089039	3089036	3089021	3089022	3089030	3089048	3089044	3089032		
240V Power Interrupt #3	240 PDC-03	240 PDC-07	240 PDC-11	240 PDC-15	240 PDC-19	240 PDC-23	240 PDC-27	240 PDC-31	240 PDC-35	240 PDC-39	240 PDC-43	240 PDC-47	240 PDC-51	240 PDC-55	240 PDC-59	
fan tray	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Wiener PL506 #2	3089013	2389007	2389021	3089011	2389006	2389005	2389025	3089024	3089019	2389009	3089046	2389024	3089026	3089015		
240V Power Interrupt #2	240 PDC-04	240 PDC-08	240 PDC-12	240 PDC-16	240 PDC-20	240 PDC-24	240 PDC-28	240 PDC-32	240 PDC-36	240 PDC-40	240 PDC-44	240 PDC-48	240 PDC-52	240 PDC-56	240 PDC-60	
fan tray	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	
Wiener PL506 #1	3089012	2389017	2389016	3089035	3089047	2389015	2389012	3089025	3089043	3089018	3089014	3089029	3089027	3089020		
240V Power Interrupt #1	240 PDC-05	240 PDC-09	240 PDC-13	240 PDC-17	240 PDC-21	240 PDC-25	240 PDC-29	240 PDC-33	240 PDC-37	240 PDC-41	240 PDC-45	240 PDC-49	240 PDC-53	240 PDC-57	240 PDC-01	
fan tray	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	Installed	



Getting To Detector Outfitting I

Color Code:

Green: Done

Orange: In progress

Red: Not Started

Fermilab network at Ash River

- Main network switches
- Detector network switches
- Wireless access
- **Configuration (DAQ/slow controls/QA)**

√ Main switches installed 12/19/11
√ Installed & tested 12/19/11
√ Installed & tested 4/05/12
DAQ/QA done 8/05/12

Detector HV/LV/network

- Racks, Rack protection
- **Rack Monitoring**
- **HV/LV power supplies**

√ Installed & tested 4/30/12
Monitoring 3/19 racks 8/22/12
Configured (untested) 8/29/12

Support infrastructure

- Unistrut & cable tray support (detector side)
- PDB/DCM tables & cable tray support (top)
- Cutting unistrut for supports

√ 1st Di-block installed 4/20/12
√ All materials in hand 5/24/12
5.5/15 di-blocks unistrut cut 6/21/12

Cooling system

- Chillers, reservoir, pumps
- Main supply/return lines
- **System tests**

√ Equipment installed 4/02/12
Return main plumbed 6/22/12
Loop tests (sans detector) 8/02/12



Getting To Detector Outfitting II

Color Code:
Green: Done
Orange: In progress
Red: Not Started

Scintillator distribution system

- Plumbing/pumps/controls ✓ Plumbing completed 4/17/12
- Scintillator plumbing leak tight ✓ Pass leak checks 4/20/12
- **Filling machines** ✓ **All machines at Ash River** **6/18/12**
- Plumbing qualified ✓ Train techs to qualify plumbing 5/07/12

DAQ

- Control room computers ✓ Counting Room operational 3/01/12
- DAQ computers ✓ Buffer computers operational 3/01/12
- GPS ✓ GPS installed 6/25/11
- DAQ test stand (TDU/DCM) ✓ Installed, tests underway 4/26/12
- Detector timing system ✓ Both timing chains installed 6/25/12
- Control room video conferencing ✓ System spec'd 2/03/12

Special facilities

- Scintillator QA trailer ✓ Trailer outfitted 11/10/11
- Outfitting parts storage ✓ 5577 ft² storage available 2/21/12
- APD storage, assembly/testing area ✓ Room prepared, stocked with tools 3/15/12



Getting To Detector Outfitting III

Color Code:
Green: Done
Orange: In progress
Red: Not Started

Cables

- | | | |
|-----------------------------------|--|----------------|
| • Timing (fiber, master-to-slave) | √ Installed & tested | 4/26/12 |
| • Timing (rack-to-rack) | √ Installed & tested | 6/25/12 |
| • Timing (DCM-to-DCM) | √ 1/2 first di-block installed | 8/23/12 |
| • Timing (DCM-TDU) | √ 1/2 first di-block installed | 4/25/12 |
| • HV network | Cables installed (untested) | 8/03/12 |
| • Network patch cables | All lengths know, cables on order | 8/27/12 |
| • FEB-DCM power | 1st di-block prototypes tested | 4/25/12 |
| • FEB-DCM communication | Lengths, harness design known | 4/12/12 |
| • DCM-network | 1/2 Cables at Ash River | 8/22/12 |

Safety clearance to operate

- | | | |
|--|------------------------------------|----------------|
| • Rack protection system | √ Approval granted (FNAL/UMN) | 5/11/12 |
| • Time Distribution Units (TDU) | √ Approval granted (FNAL/UMN) | 6/25/12 |
| • Data Concentrator Modules (DCM) | √ Approval granted (FNAL/UMN) | 6/25/12 |
| • Power Distribution Box/system (PDB) | √ Approval granted (FNAL/UMN) | 6/25/12 |
| • Scintillator Distribution System | Safety walkthrough complete | 4/25/12 |
| • Detector structure (prior to filling) | Complete all but signatures | 6/25/12 |
| • Front end board (FEB) | Safety walkthrough | Sept |
| • Equipment racks (scintillator in detector) | Safety walkthrough | Sept |



Safety Reviews in Progress

Detector Block Structure (filled with Scintillator):

- Internal review in progress

Block Pivoter

- Division/UMn signatures?

Glue Machine

- Division/UMn signatures?

Leak Tester

- Expected signatures this week

Scintillator Distribution System

- Engineering notes for piping (NOvA, FNAL Process Engineering)



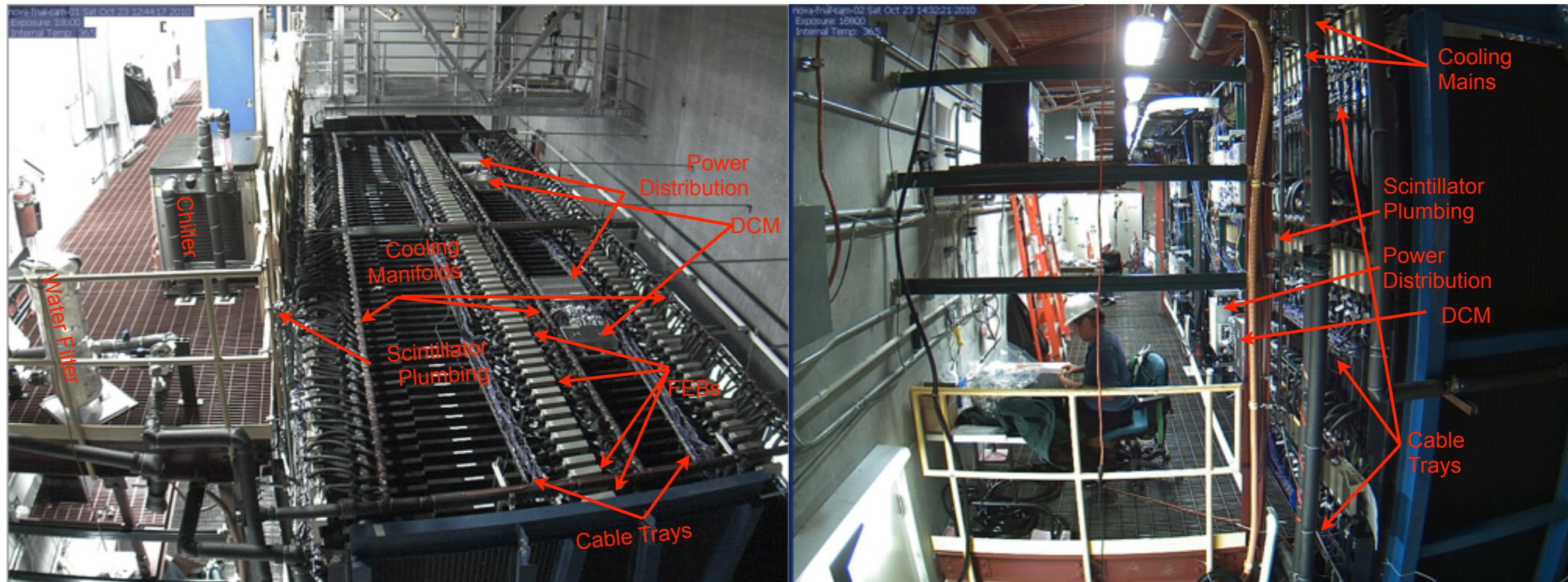
Detector Outfitting

Far detector outfitting based on prototype near detector experience

- Far detector top mostly the same as prototype near detector
- Far detector side some details differ

Significant differences:

- Simpler cooling system likely faster installation
- Side support structures adjustable to facilitate filling





Procedures Needed at Ash River

Procedure	Author	DocDB	Comments
PDS Installation	R.Ehrlich	5675	
PDS Checkout	R.Ehrlich	5601	Updated 4/15/11
PDS Operating Manual	R.Ehrlich	5347	
Fill Machine Test	J.Musser	5276	
Scint. Light Transmission (tintometer)	S.Mufson, B.Baugh	5828	Updated 5/24/11
Scint. Light Transmission (photospec.)	S.Mufson,	5828	Added 1/24/12
Manifold Cover Repair	M.Muether	5139	Addendum to cover filled modules
Module Leak Testing (FNAL)	E.Voirin	5109	
ND prototype Water System Repair	M.Zuckerbrot	5465	
ND prototype Water System Testing	M.Zuckerbrot	5465	
Draining Scint. from ND prototype	M.Zuckerbrot	5891	
FEB data cable bundling	T.Coan, C.Rosenfeld	6101	
Scintillator spill procedures	M.Gebhard	6535	
Far detector scint. system commissioning	J.Musser	6533	Updated 5/14/12
Far detector scint. filling	J.Musser	7263	
Module Leak Testing (ND prototype)	E.Voirin	5109	
Far detector LV rack turn on	R.Tesarek, C.Cadeau	7399	
Far detector scintillator top off	J.Musser	7263	
Sample jar cleaning procedure	B.Baugh, S.Mufson	7425	Updated 5/06/12
Far detector HV rack turn on	R.Tesarek, C.Cadeau	7491	
Far detector network rack turn on	R.Tesarek, C.Cadeau	7492	
Module/snout inspection at Ash River	R.Tesarek	7580	Bold font represent changes since Lehman review



Procedures Needed at Ash River

Procedure	Author	DocDB	Comments
Optical connector gland depth measurement	R.Tesarek	7580	Bold font represent changes since Lehman review
FEB box attachment to module (gunsite) QA	R.Tesarek	7580	
Optical Connector QA at Ash River	R.Tesarek	7580	
Optical fiber test procedure	C.Bromberg	7542	
Operating manual for optical fiber tester	C.Bromberg	7542	
Module leak test (Argonne apparatus)	S.Magill	7239	
FEB/APD Installation	L.Mualem, M.Muether	4775	Update in progress
FEB data cable tests	M.Muether	5926	Basic info here
APD/FEB/DCM installation, checkout	S.Kasahara, D.Perevalov	5657	Needs written installation procedure
Scintillator top off (ND prototype)	K.Kephart		
Cooling system testing (Ash River)	E.Voirin		Writing docs
Power Distribution System cable bundling	R.Ehrlich		
TDU installation & checkout	R.Kwarciany		Writing docs
Heat sink/Spacer frame leak check	L.Mualem, M.Muether		
Scint. Light Yield	S.Mufson(C.Bower)	4030	Talk, not formalized
Optical fiber test procedure (automated)	D.DeMuth		Writing docs
Module leak tester procedure (automated)	D.DeMuth		Writing docs



Summary

Making progress at Ash River

- Control room, computing, and network operational
- DAQ test stand operational (begin remote DAQ debugging)
- Detector racks ~ 90% complete (final network cabling)
- Check off significant infrastructure tasks
- Working ahead on “filler” tasks (~40% of first di-block infrastructure in place)

Busy and exciting time in front of us