DUNE Electrical Infrastructure

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FS Integration/Installation Planning

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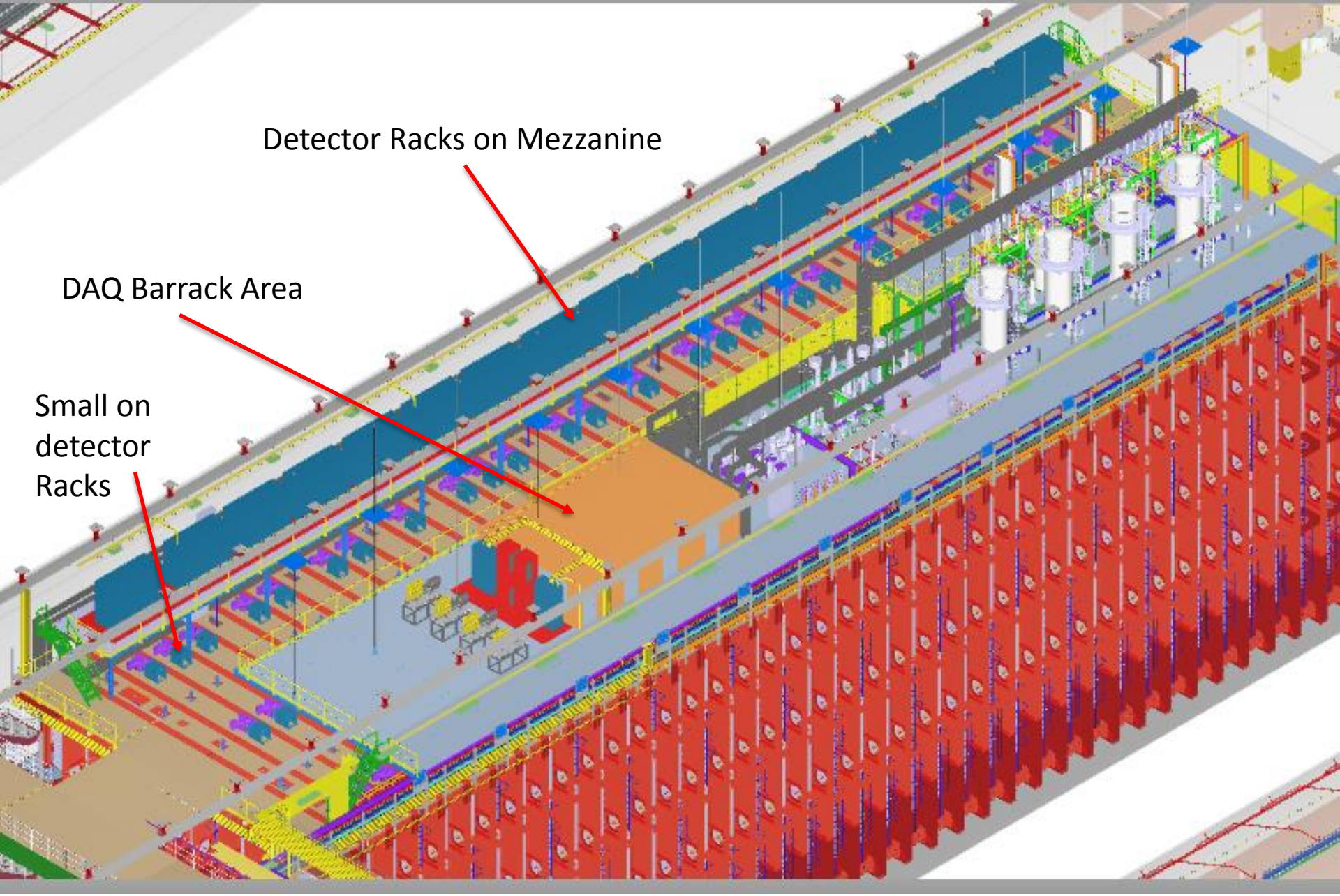
Fermilab CERN Sanford Underground Research Facility U.S. DEPARTMENT OF ENERGY Office of Science

Outline

- DUNE AC power distribution design and distribution
  - Detector Racks
  - DAQ Room
- Requested information being gathered from Consortia
  - Cables, racks, equip, power, detector safety


Detector Racks on Mezzanine
DAQ Barrack Area
Small on detector Racks

AC Distribution to ~76 Detector Racks (42U 36” deep)

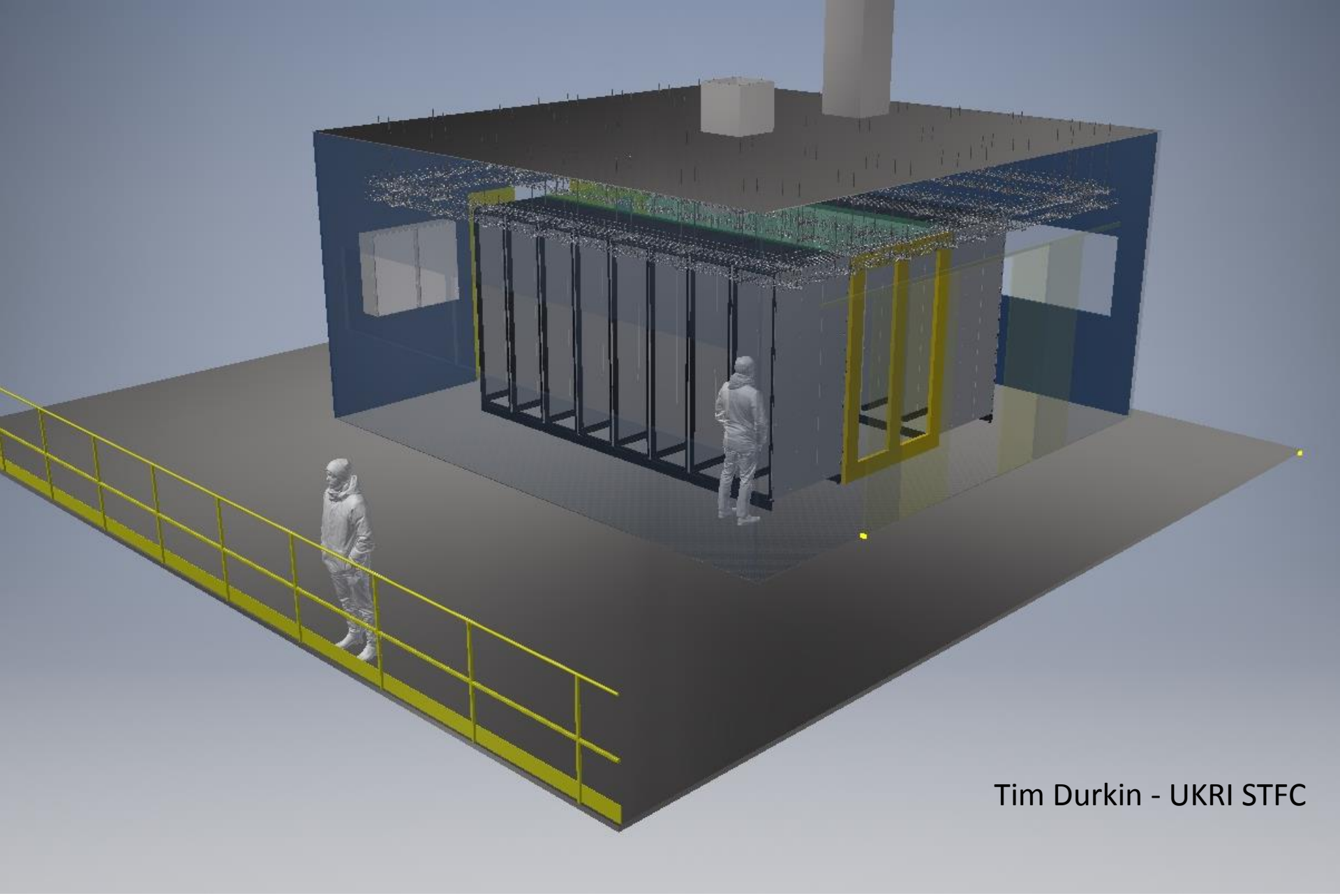
- Single line electrical drawing “**LBNF_Level_4850_SLED-Sheet_1-Rev_3.pdf**” exists in EDMS 2169065
- Power will be distributed to Detector Racks which reside on Detector Mezzanine.
- ~76 Racks will be available and will be provided a 120V/30Amp service.
- Racks will be air-cooled.
- Requests for special high power racks should be submitted for review. Cooling design should be described.
- No AC distribution is planned for the top of the cryostat.
- Detector Racks will have pre-installed a rack protection system, ground cable, network switch, cooling fans, air filters and power distribution units (PDUs)

Small On-Detector Racks

- 75 small (~15U) on detector racks located near each APA feedthrough
- Primarily will house PD Readout
  - Qty (2) 1-2U DAPHNE readout units
  - 3U Light Monitoring units
  - ~2U for Fiber Patch panels
- No AC power
- Air-cooled

AC Distribution of Power for DAQ

- DAQ infrastructure requirements documented in EDMS 2233290.
- Working document - Single line electrical drawing "**DUNE_DAQ_Room_UPS_schematic.pdf**" exists in EDMS 2169065.
- Delivers 100KW per detector.
- Includes preliminary design for UPS 5 minute backup.


Tim Durkin - UKRI STFC

DUNE Cables, equipment, power and equipment safety

- All Consortia Technical Leads have been asked to fill out spreadsheets to allow collection of information on
  - Cables
  - Equipment and power
  - Detector Safety System/Hardware Interlocks
- Completed/working version of the spreadsheets should be placed in EDMS 205264.
- This information will
  - Allow work on rack assignments and rack builds
  - Enable understanding of cable routes and lengths
  - Refine power envelopes

Cable Query

	A	B	C	D	E	F	G	H	I	J
1	List of cables required by Consortia									
2										
3	Item#	Cable Description (What is purpose of the cable?)	Location of endpoint 1 (Provide enough info to identify location - piece of equipment, power supply, rack ...)	Location of endpoint 2 (Provide enough info to identify location - piece of equipment, power supply, rack ...)	Quantity Required (not including spares)	Approximate Length (m)	Describe, if any, length constraints	Is Cable in Warm or Cold?	EDMS Entry describing cable (includes specifications of cable/wire, connectors, pinouts, and shield connections)	Responsible party if cable is not provided by this consortia
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										

CABLE LIST | EQUIPMENT LIST | Detector Safety System | Sheet2

Equipment Query

	A	B	C	D	E	F	G	H	I
1	List of equipment (both commercial and custom hardware including power supplies, readout modules and other) required by Consortia								
2	Block Diagram showing equipment configurations is located in EDMS XXXX								
3									
4	Item#	Equipment Description (What is purpose of the equipment?)	Location of equipment (Detector racks, small racks near APA feedthrus, DAQ room, other)	If rack mounted, specify number of U required in rack, otherwise specify dimensions	Power required (KW)	Describe any proximity constraints	Quantity Required (not including spares)	Is Equipment in Warm or Cold?	EDMS Entry describing equipment (both commercial and custom specifications should be provided)
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									

CABLE LIST | EQUIPMENT LIST | Detector Safety System | Sheet2

Detector Safety System

	A	B	C	D
1	Detector Safety System interlocks identified			
2				
3				
4	Item#	Description of required interlock	Is interlock internal to consortia?	
5				
6				
7				
8				

Consortia electrical equipment installation

- All Consortia team members will need to coordinate work with SURF Installation team.
- Work expected to be limited to installing modules; no work with exposed energized conductors.
- Safety group will specify training requirements.
- Electrical Technicians will install power supplies and technicians will install long cable runs.

Consortia need to use EDMS for documentation

- Folder Structure can be tailored to specific consortia
- If you need help, let us know.
- Examples: