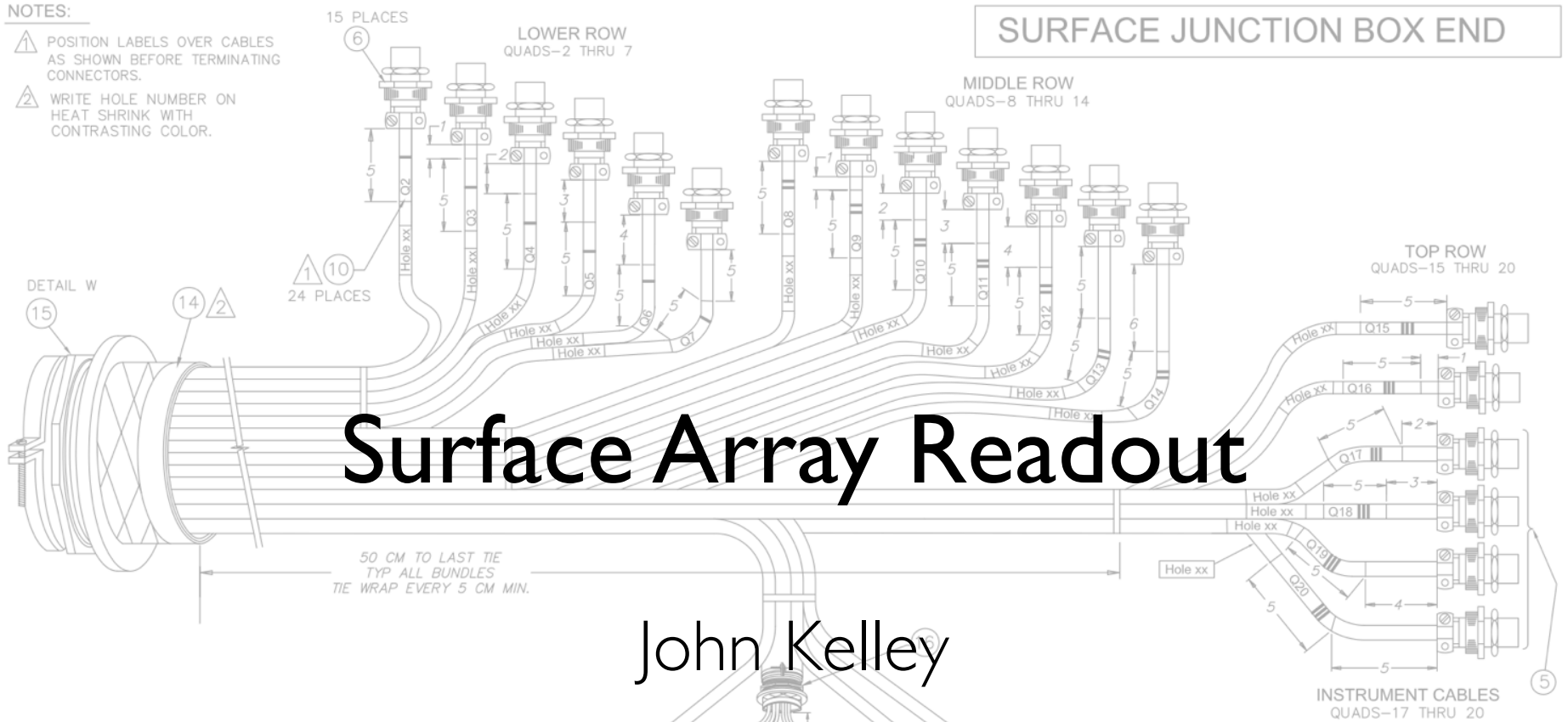


- NOTES:**
- ▲ POSITION LABELS OVER CABLES AS SHOWN BEFORE TERMINATING CONNECTORS.
 - ▲ WRITE HOLE NUMBER ON HEAT SHRINK WITH CONTRASTING COLOR.

SURFACE JUNCTION BOX END



Surface Array Readout

John Kelley
Gen2 Workshop
26 January 2015

ALL DIMENSIONS ARE IN CM UNLESS OTHERWISE SPECIFIED.



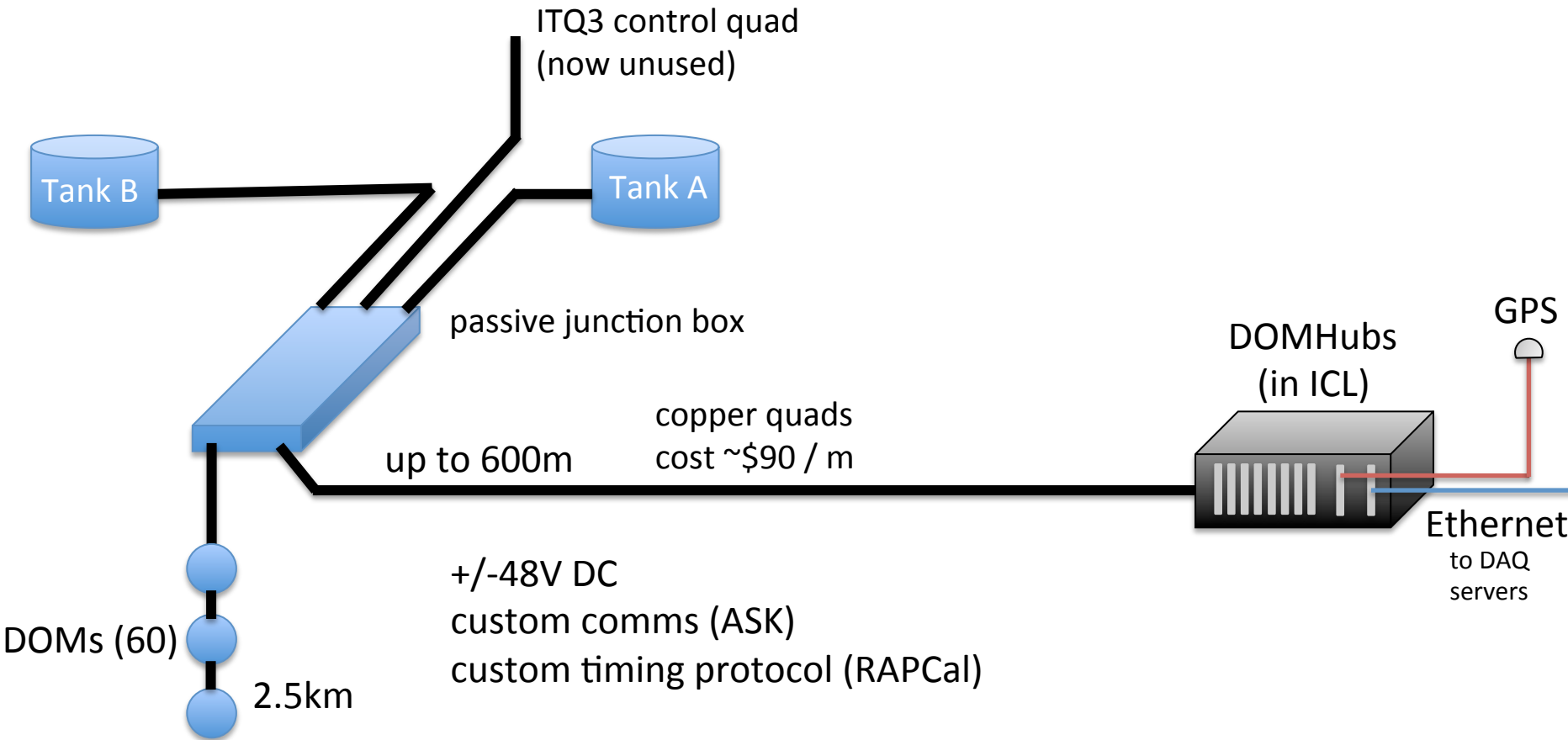
University of Wisconsin-Madison					
Antarctic Astronomy and Astrophysics Research Institute					
IceCube Project					
222 W. Washington Ave. Madison, WI 53703					
					
Title					
ICECUBE SURFACE CABLE ASSEMBLY ASSEMBLY DRAWING					
File Name	Size	Sheet	of	Drawing No.	Rev
SURF-CBL-ASSY-080625	B	3	9	9400-0006-DWG	C

Goals

Design a surface array digitization and readout development plan that:

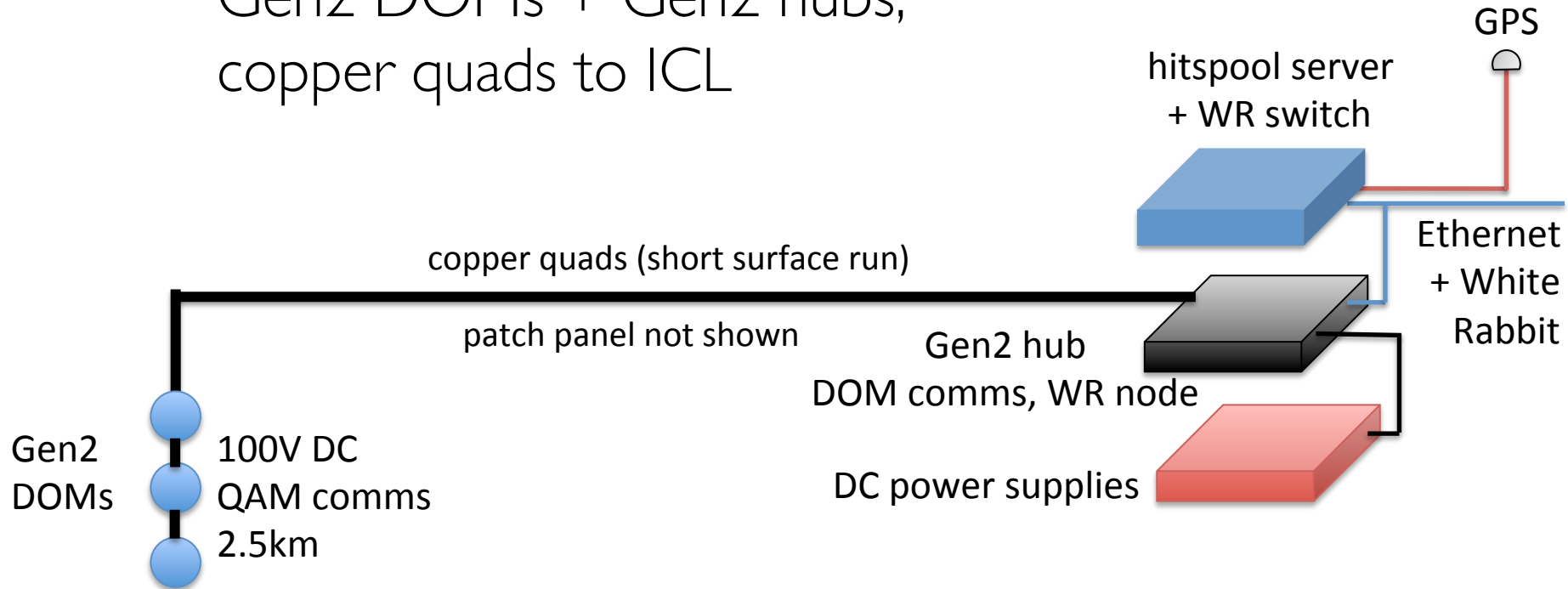
1. Allows rapid deployment and integration into the IceCube DAQ (i.e. 2015–16 season)
2. Transitions to Gen2 technologies to allow simple integration into the future DAQ
3. Leverages the surface array development for testing / prototyping of Gen2 hardware

DOM Readout (IceCube+IceTop)



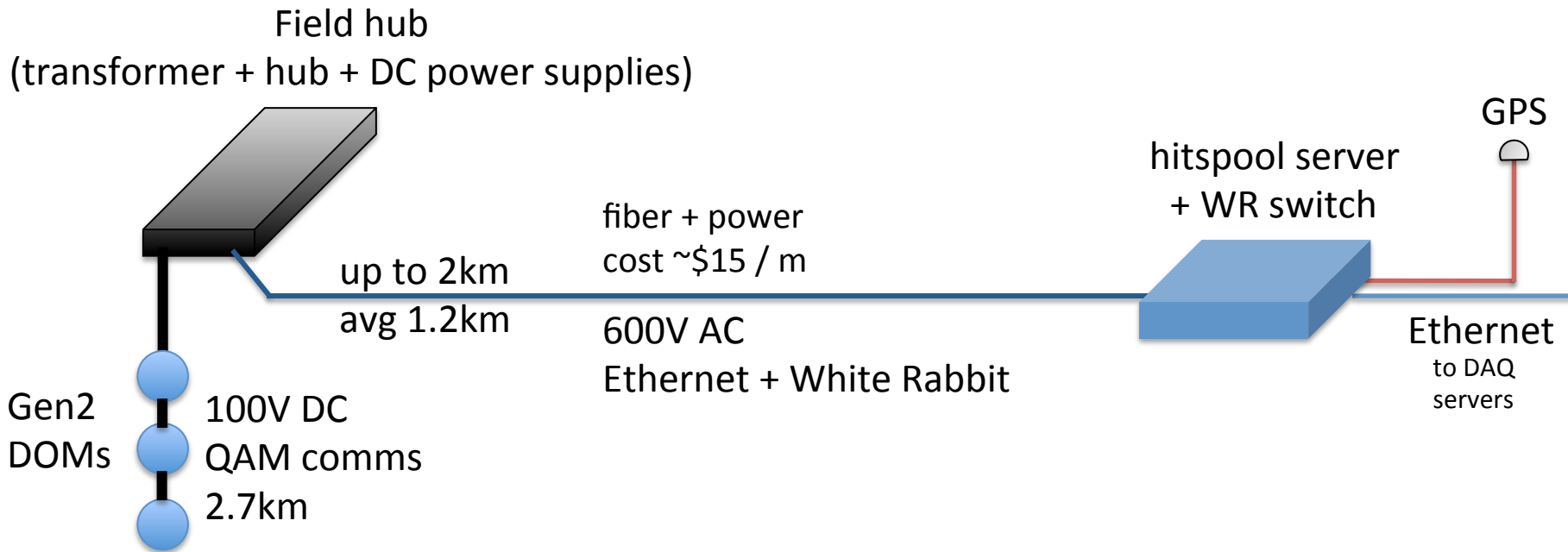
DOM Readout (PINGU)

Gen2 DOMs + Gen2 hubs,
copper quads to ICL



DOM Readout (Gen2 HEX)

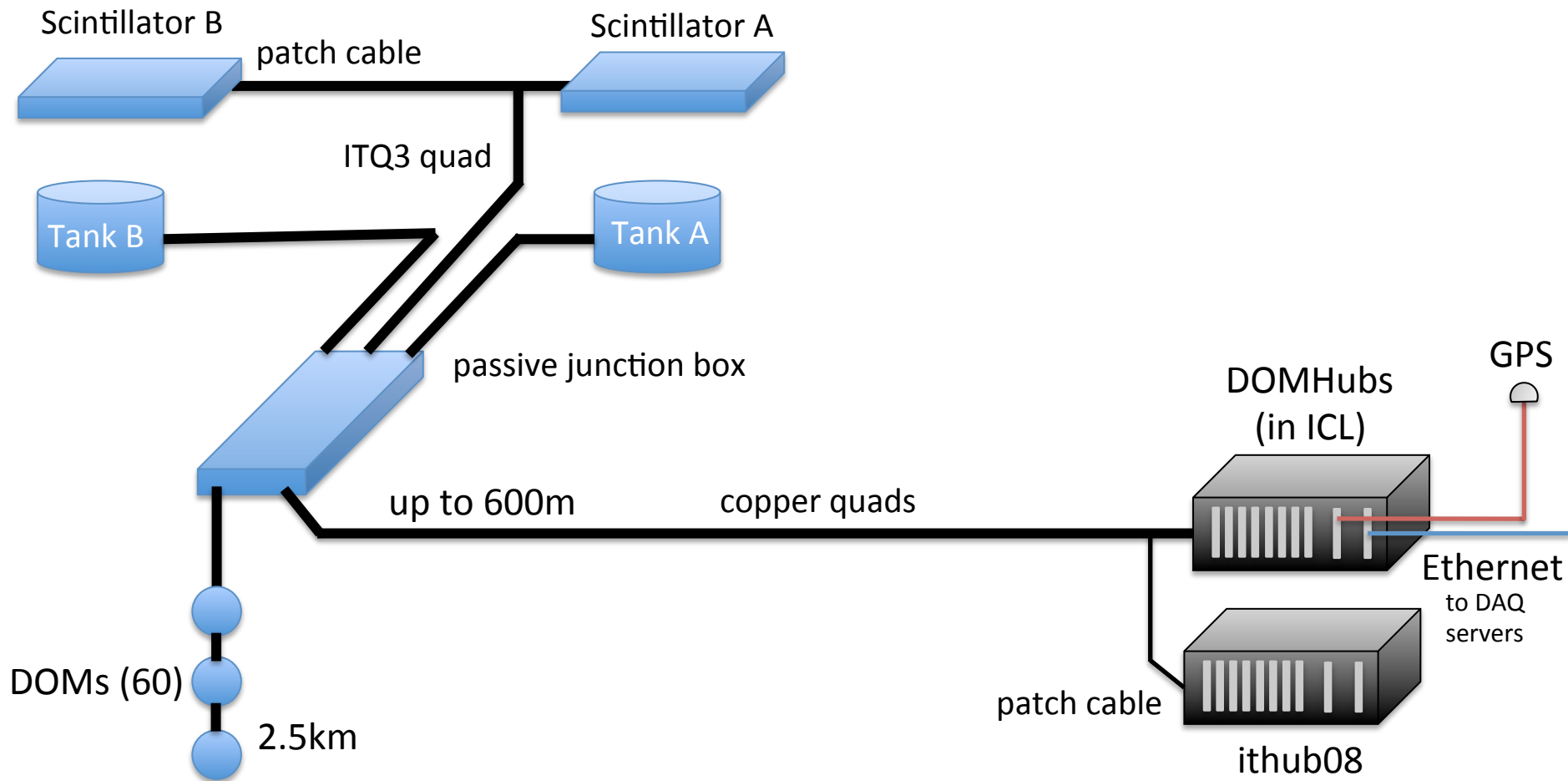
Gen2 DOMs + Gen2 field hubs, fiber to ICL



Surface readout: Phase I (2015)

- DOM mainboard reads out a small PMT + ganged scintillator fibers
- Power+communication to ICL via IceTop control quad
 - minor digging required at some tanks
- Simple integration into IceCube DAQ
 - connected to IceTop DOMHub ithub08 (20 free pairs)
 - looks like a DOM
 - automatic nanosecond synchronization to IceTop
 - early data without any DAQ struggles

Surface Readout Phase I

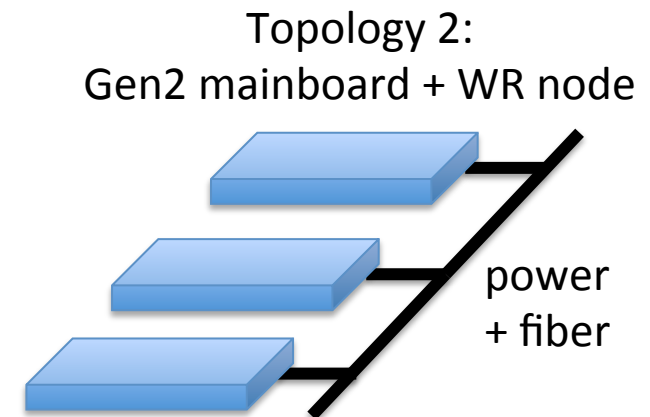
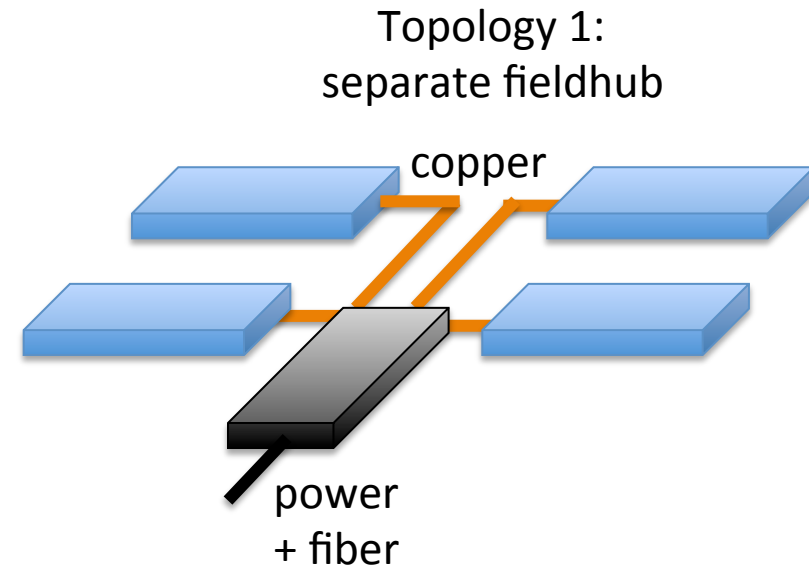


Surface readout (Phase 2 – 2016/17)

- Gen2 mainboard prototype replaces DOM mainboard
- Gen2 hub prototype replaces ithub08
 - White Rabbit synchronization inside ICL
- Connection to ICL still via IceTop control quad
 - no new trenching required
 - new QAM comms + timing protocol over the cable
- ~PINGU architecture

Surface readout (Phase 3 – 2018+)

- Gen2 mainboard for scintillator readout
- Gen2 fieldhub fans out to scintillators
 - OR mini-fieldhub / WR node in scintillator box
- Connection to ICL via power + fiber
 - allows future veto extension beyond IceTop footprint
- ~Gen2 HEX architecture



Summary

- Three-phase surface array readout plan
 - uses the existing IceCube DAQ infrastructure to get data quickly
 - leverages R&D we already need for Gen2 development
- Readout development parallels Gen2 path
 - phase 1: IceCube architecture
 - phase 2: ~PINGU architecture
 - phase 3: ~Gen2 HEX architecture
- By the time we build PINGU and HEX, we will have significant experience at pole with the critical new DAQ hardware

Backup

Gen2 Surface Junction Box

