

IceCube Upgrade Project Organization and Configuration

Farshid Feyzi
Project Manager

Upgrade Logistics Review
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Outline

- Project Scope and Configuration
- Overall Work Plan
- Project Organization
- Schedule and Risks
- Outline of presentations

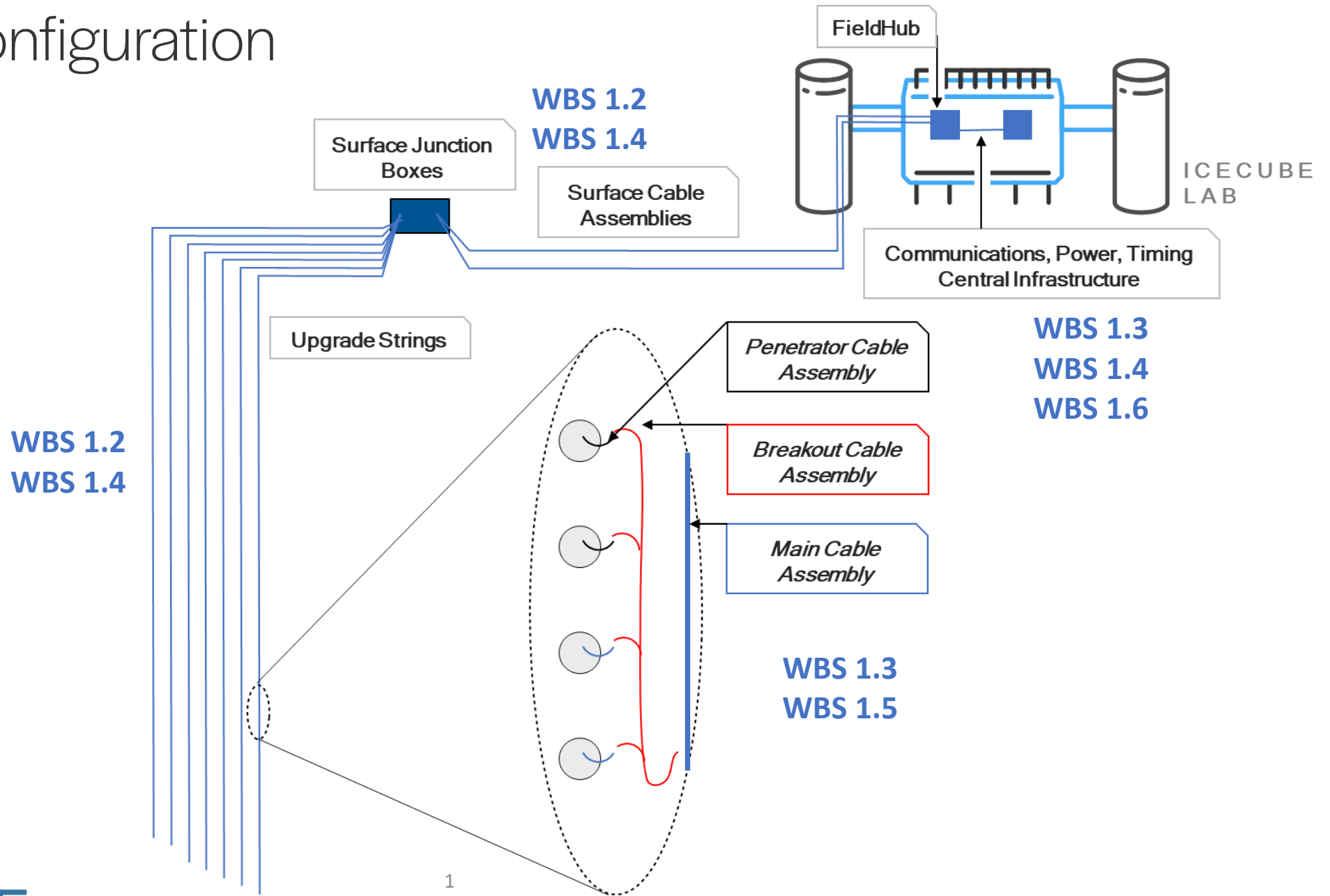
Upgrade Project Scope

- 7 new strings in the center of IceCube
- Instrumentation defines each string:
 - Optical modules
 - Calibration devices
 - R&D device
- Order of drilling and installation will be as shown

Type	String	87	88	89	90	91	92	93	TOTAL
Optical modules 679 modules	mDOM	59	57	57	53	60	58	58	402
	DEgg	39	41	40	38	40	39	40	277
Calibration devices 61 devices	pDOM	1	1	2	1	2	4	3	14
	POCAM	2	2	5	3	2	3	4	21
	Pencil Beam (PB)	1	2	1	2	3	1	1	11
	Acoustic Module (AM)	2	1	2	1	1	1	2	10
	Swedish Camera (SWE)	1	1	0	1	0	1	1	5
R&D devices 59 devices	Long Optical Module (LOM)	0	1	2	1	3	3	2	12
	DM ice	0	1	0	1	0	0	0	2
	Radio Pulsar (RP)	0	1	1	1	0	0	1	4
	Radio Receiver (RR)	1	0	0	0	0	2	0	3
	Abalone Hub (AH)	0	0	1	1	0	0	0	2
	Wavelength-shifting Optical Module (WOM)	4	4	0	4	0	1	1	14
	Fiber-optic Optical Module (FOM)	2	1	1	0	1	1	1	7
	Fiber Test System (FTS)	0	0	0	6	6	0	0	12
	Pressure sensors	"Paro" (PS)	1	1	1	1	1	1	1
ALL	ALL	113	114		114	119		115	803
				113			115		

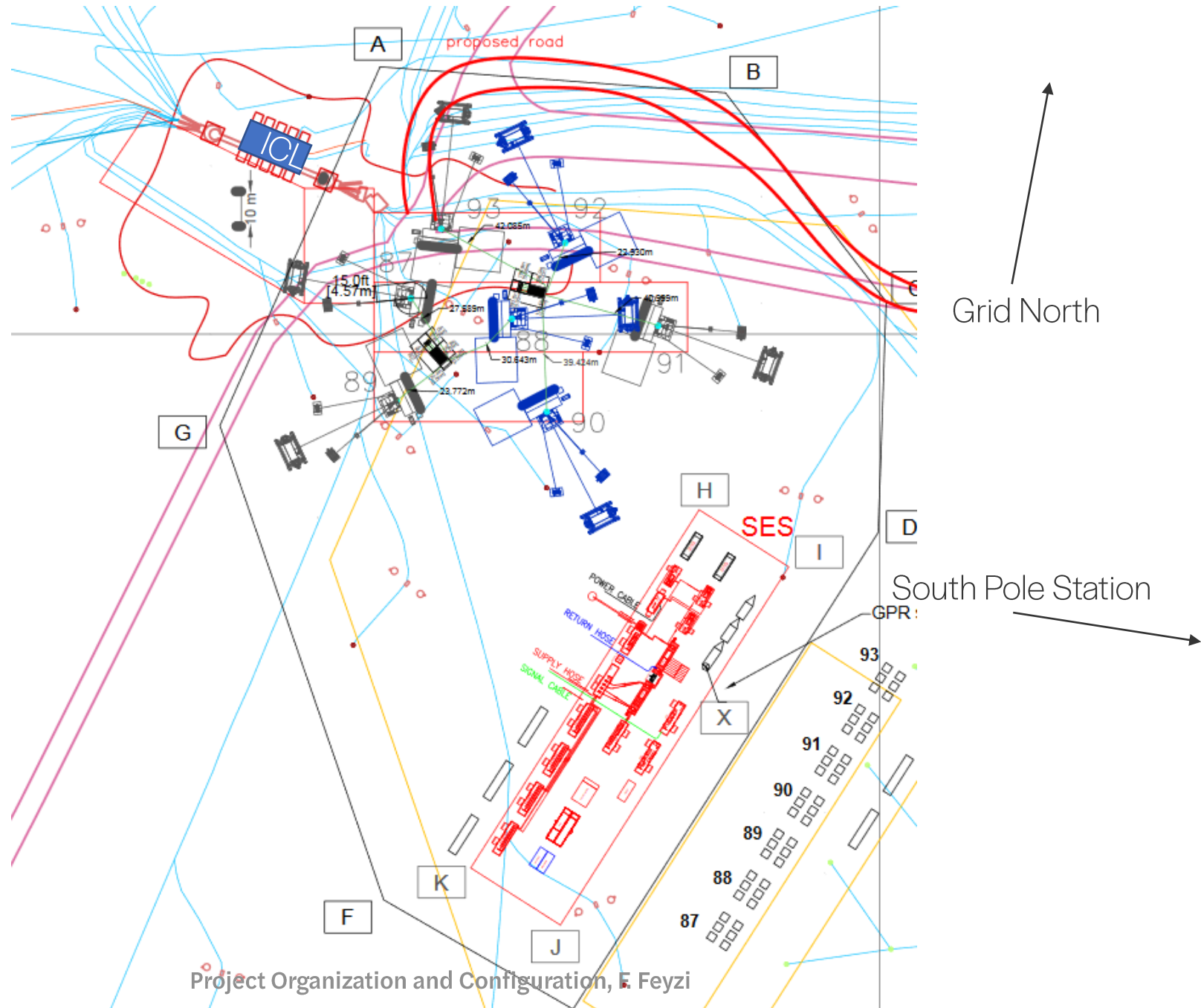
Project Configuration

- WBS organized according to project configuration
- Each WBS area has a control account manager who is also the level 2 manager

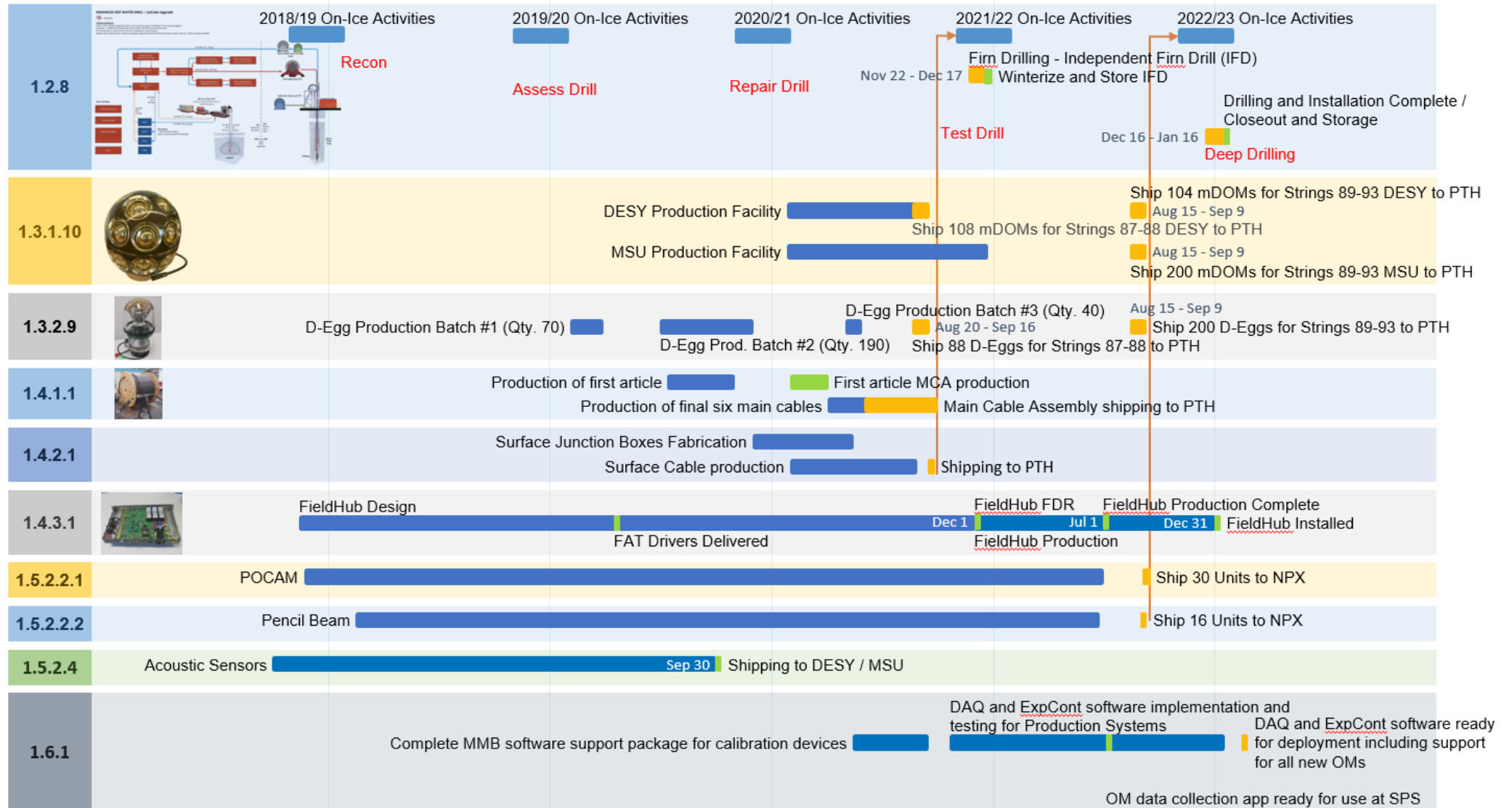


Surface Plan Established

- Hole locations and surface cable paths determined
- Overall survey completed
- Drill site and sequence established



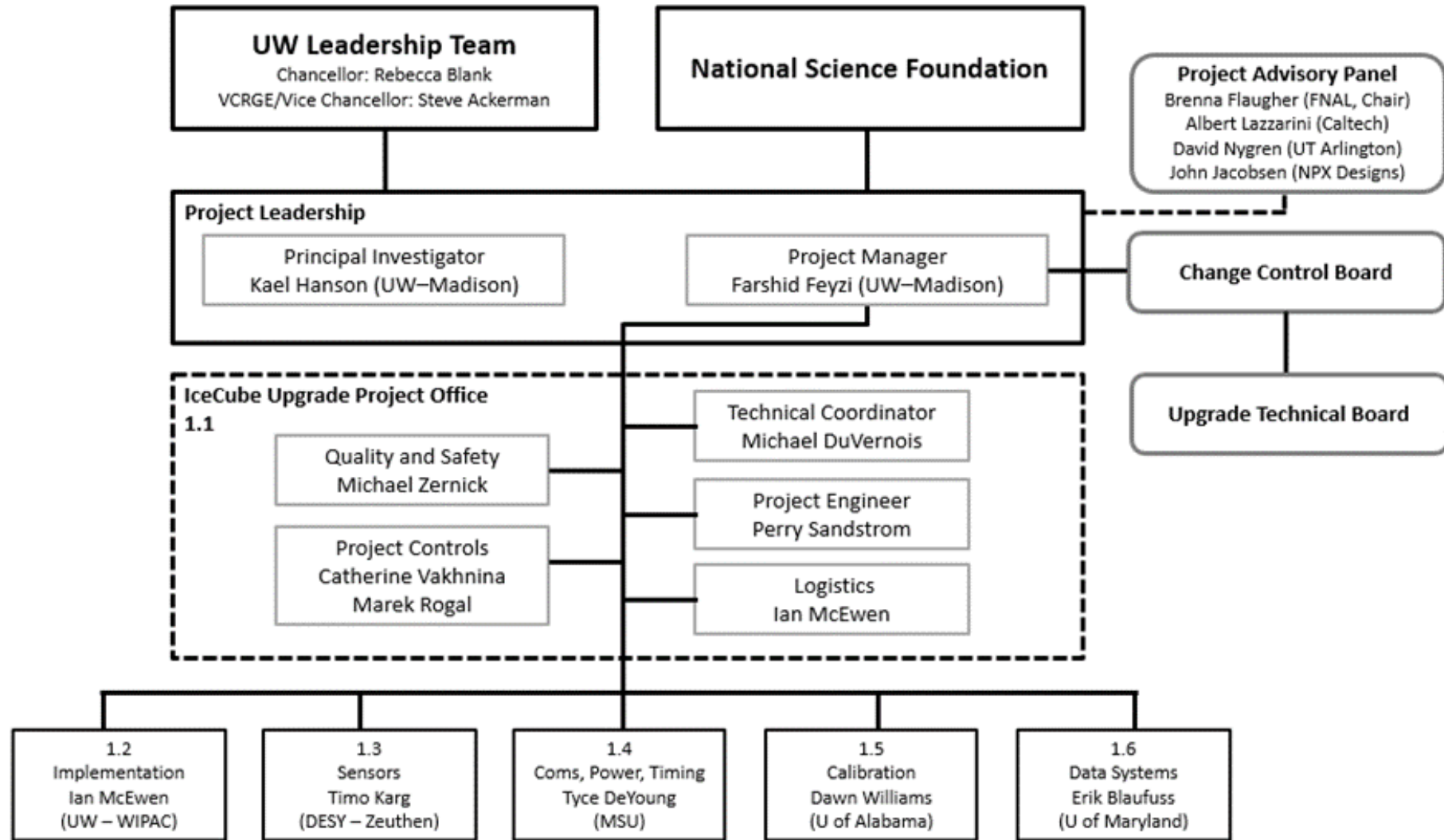
Pre-COVID19 Schedule



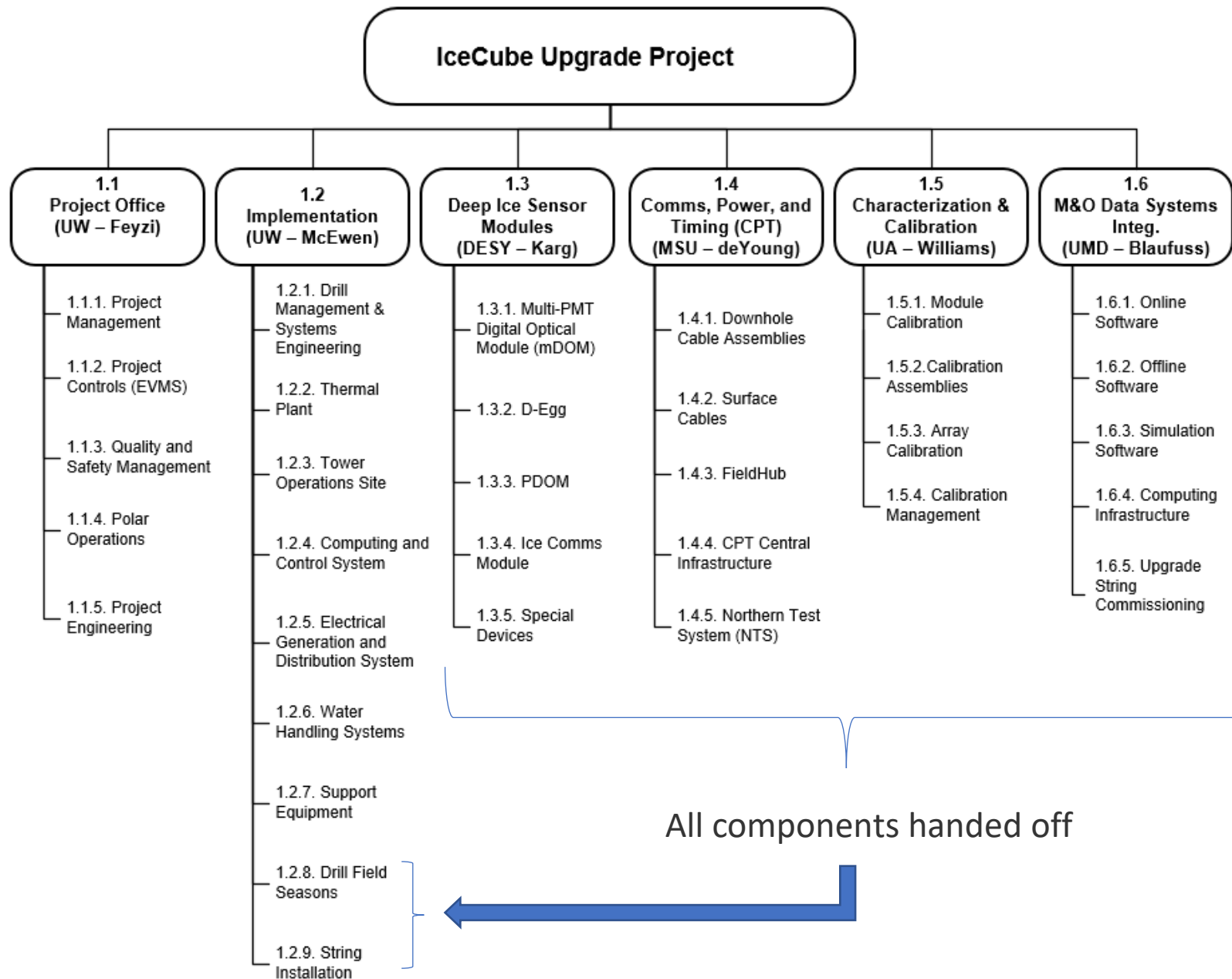
Overall Project Work Plan

- Off-Ice work
 - Construction and testing of instrumentation and cables – nearly all contributed in kind
 - Reuse nearly all drill components from Gen1 – most are in Antarctica
 - Drill repair and refurbishment components – complete and ship south
- On-ice: Five field seasons planned
 1. **2018-19:** Locate drill components and inventory – ✓ **Done**, started long-leadtime procurements
 2. **2019-20:** Assessment of drill and retro what needed work off-ice – ✓ **Done**, in fairly good condition, retro completed
 3. **2020-21:** Repair drill and initial test – Cancelled, schedule TBD
 4. **2021-22:** Drill set up, full hot test, drill 7 firn holes, install surface cables and junction boxes– Cancelled, schedule TBD
 5. **2022-23:** Drill 7 deep holes and install all instrumentation- Schedule TBD

Project Organization to Level 2



Organization at Level 3



Project Schedule, Cost and Risks

- The project cost estimates was based on a five-year schedule, it will be reassessed as part of rebaseline review
- Project schedule is delayed at least two years, plans for access to the SP are not determined at this time
- Project technical risks are being re-evaluated as part of the rebaseline process
- Project schedule risks are also being re-evaluated – directly impacted by access to site

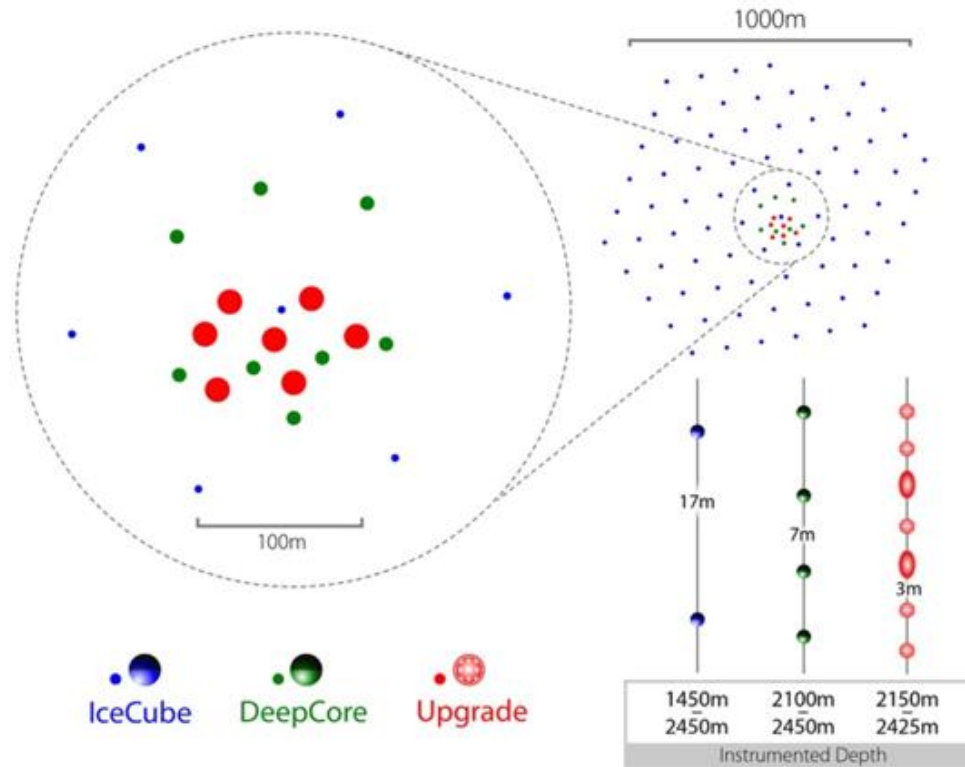
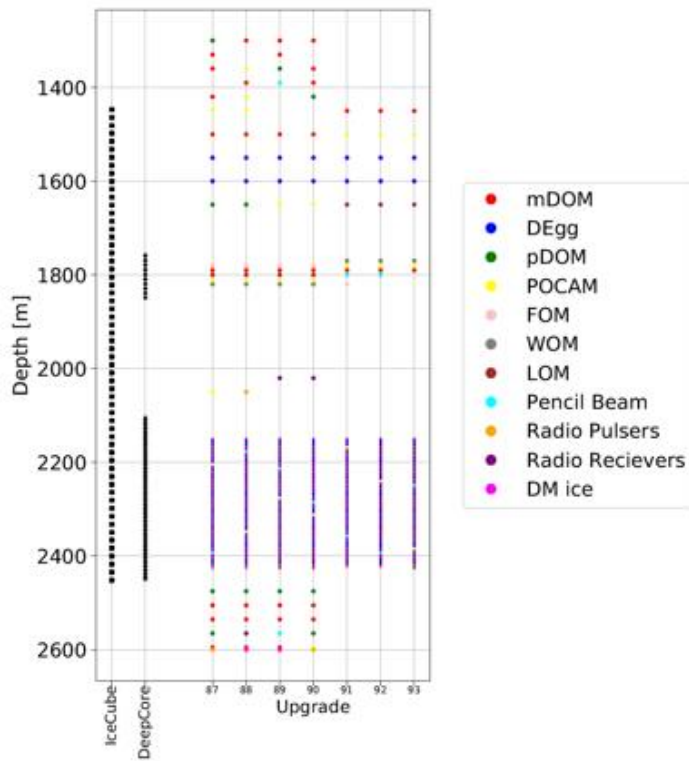
Outline of Presentations

- Requirements for cargo and population for drilling and installation
- Ground rules and assumptions for estimating cargo and population
- Examples of using methodology
- Lessons learned from Gen1 and how they apply to Upgrade
- Drilling and installation operations for Upgrade
- Field season work plans and scenarios
- Float in cargo shipment stream
- Sensitivity to cargo and population delays
- Requirements for fuel

THANK YOU FOR THE REVIEW!

Backup Slides

Project Objectives



Location and Depth relative to IceCube Gen1

1. Neutrino Properties
2. Recalibration and Reanalysis of IceCube Data
3. IceCube-Gen2 Research and Development, not directly funded

Drill - Schematic

ENHANCED HOT WATER DRILL – IceCube Upgrade

PSL v20190301

SYSTEM SCHEMATIC

Intent: Drill 7 IceCube-magnitude holes in one season to support installation of the IceCube Upgrade

Capacities: 4.6 MW thermal delivered to drill nozzle; 250 kW system electrical load

Run two gensets at a time, each at 125 kW, third genset is online backup

Makeup water obtained from stationary Rodwell, supported by ARA Hot Water Drill (pump, heat, hose reel – RWS no longer available)

