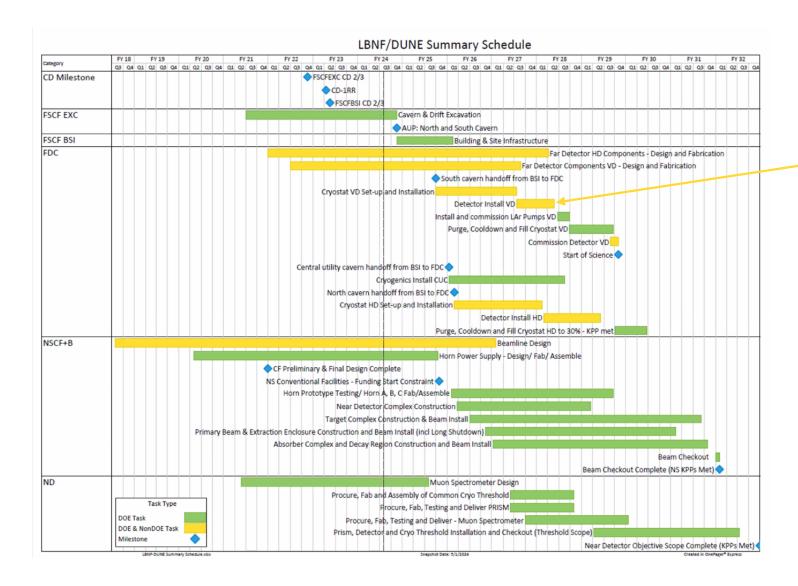
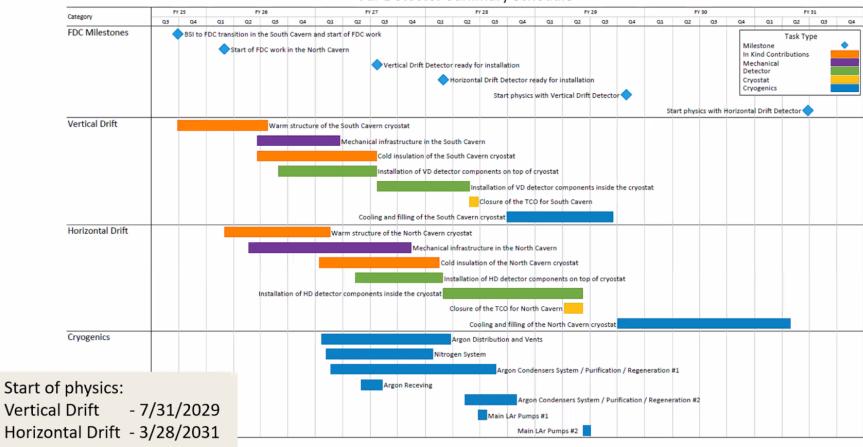
VD PDS Schedule Summary

DUNE PDS Schedule Workshop NIU - May 19, 2024

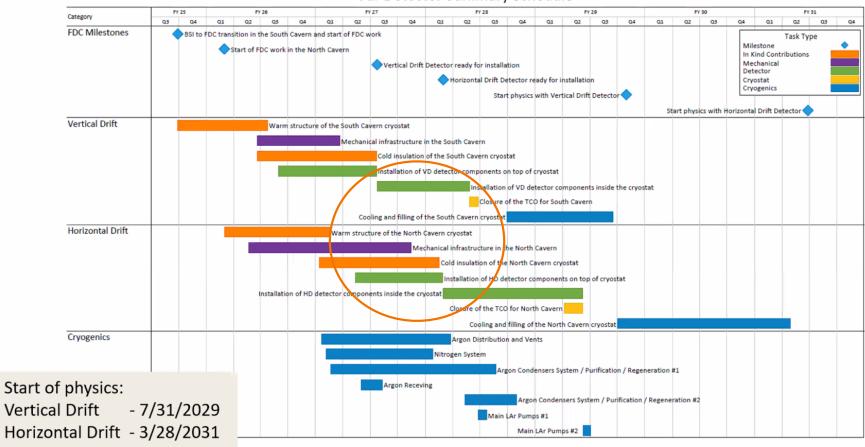
P. Shanahan - Fermilab



Far Detector Summary Schedule



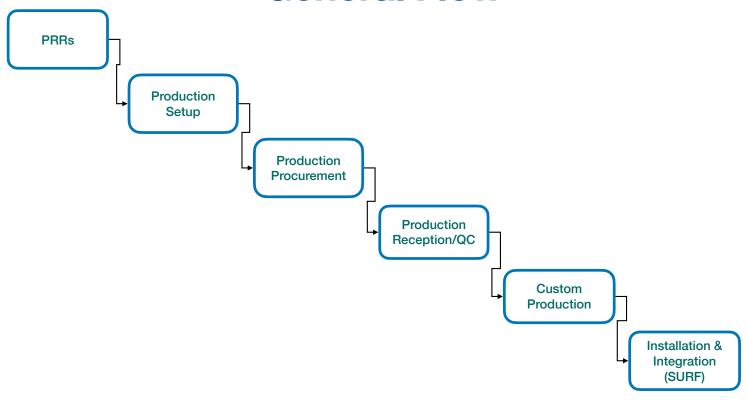
Far Detector Summary Schedule

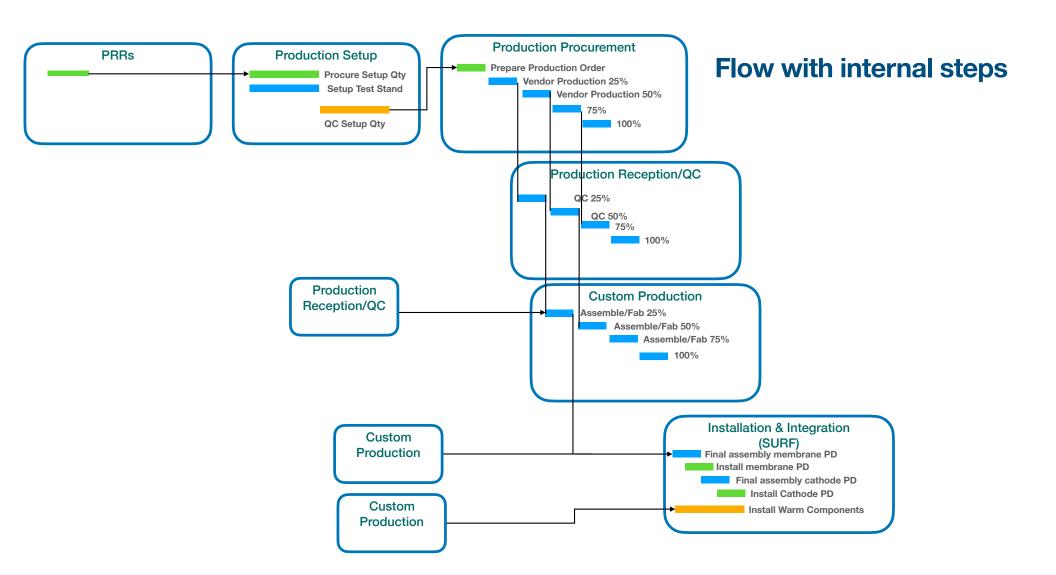


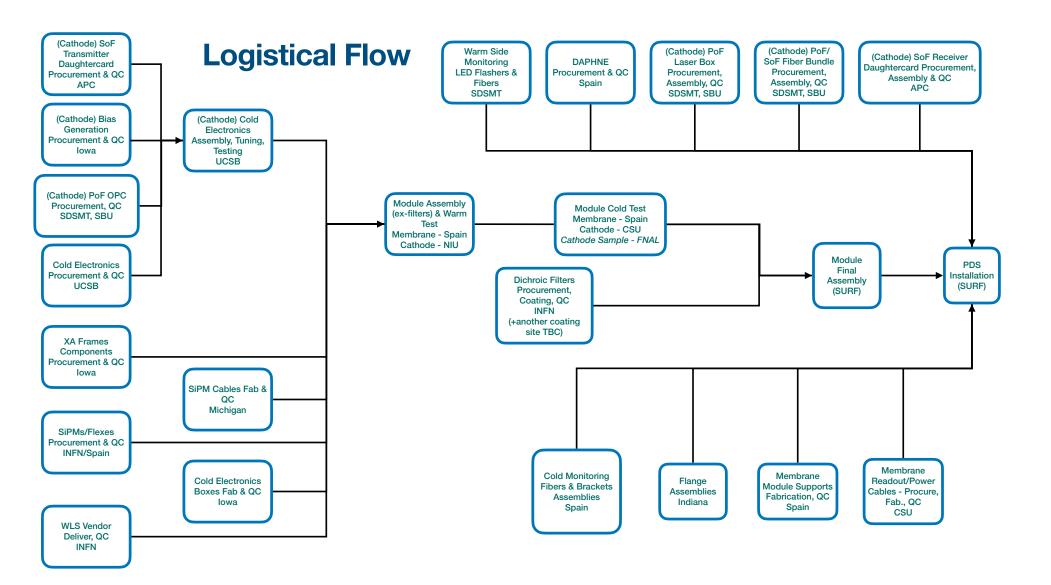
Caveats

- There are still a few logic bugs.
- Some scope assignments remain TBD
 - Membrane cold electronics solution
 - Addition of Fermilab resources for DAPHNE
 - Other possible reassignments of scope
- This schedule assumes flex circuits ordered by SiPM vendors
- Some shipping is missing more on this later

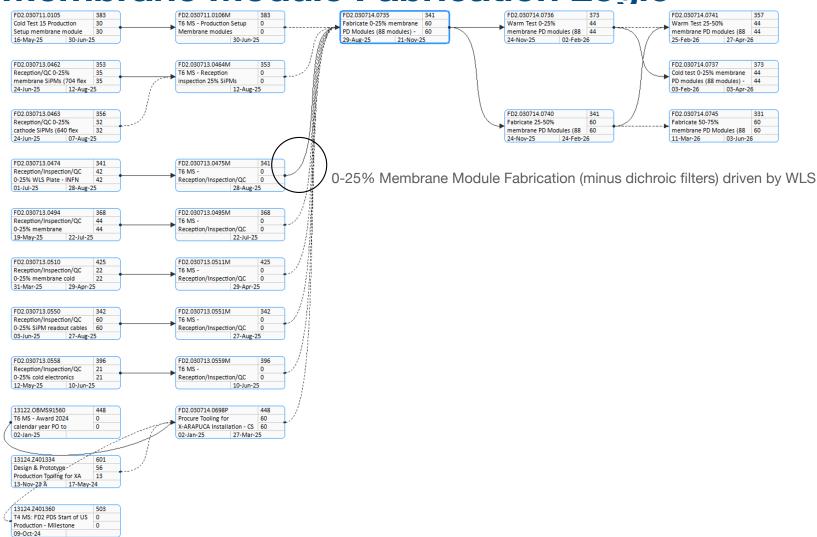
General Flow



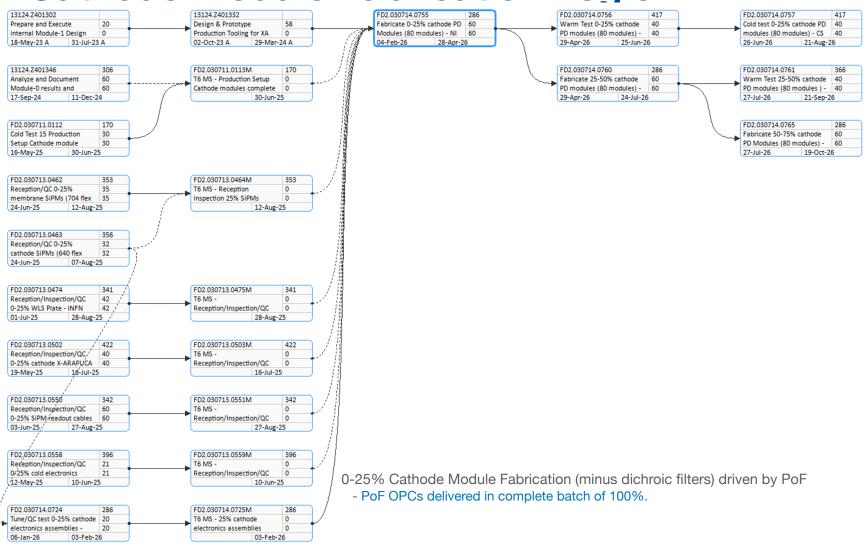




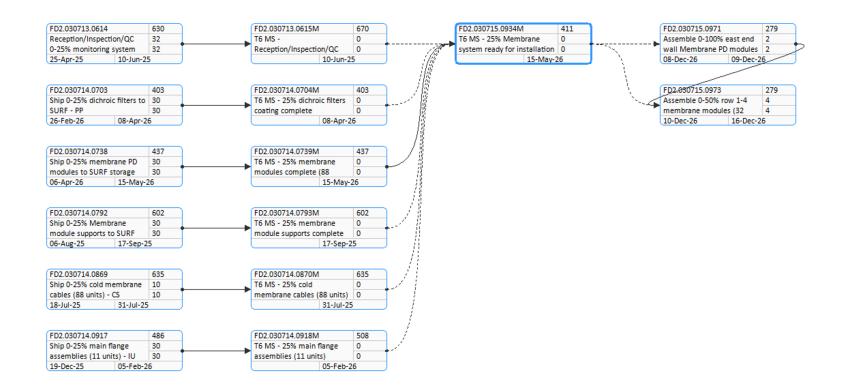
Membrane Module Fabrication Logic



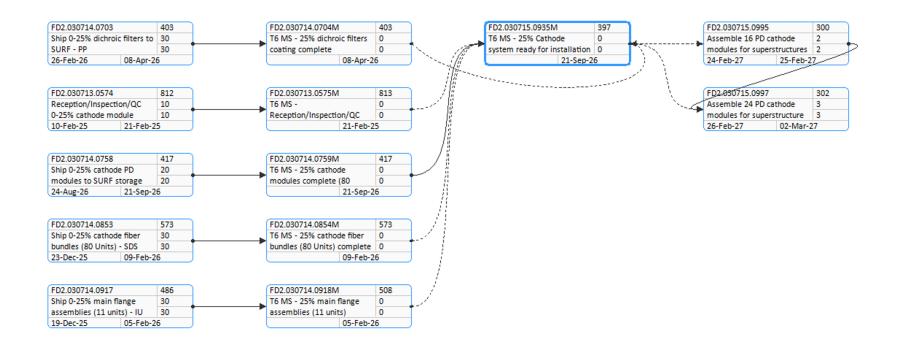
Cathode Module Fabrication Logic



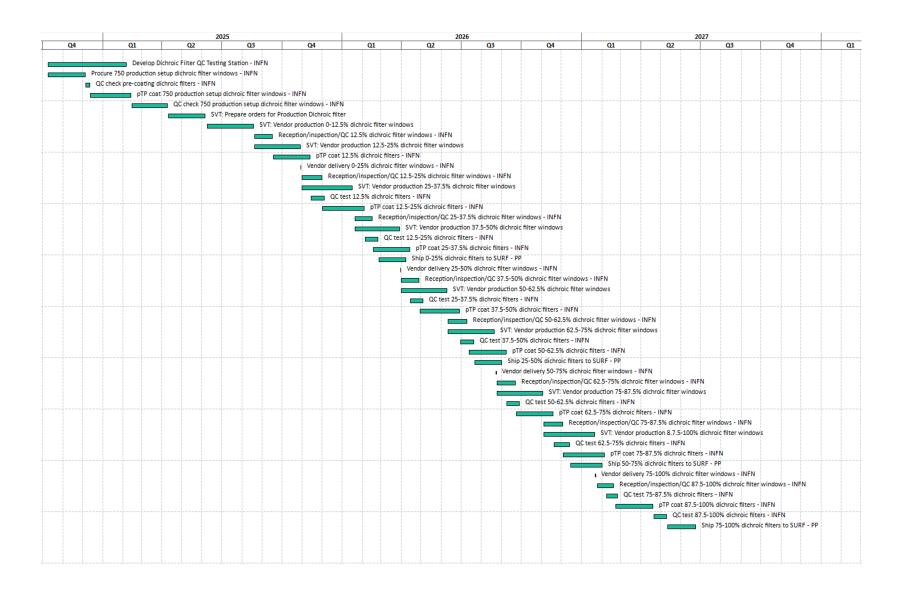
Logistical Flow to SURF - 1st 25% of Membrane System



Logistical Flow to SURF - 1st 25% of Cathode System



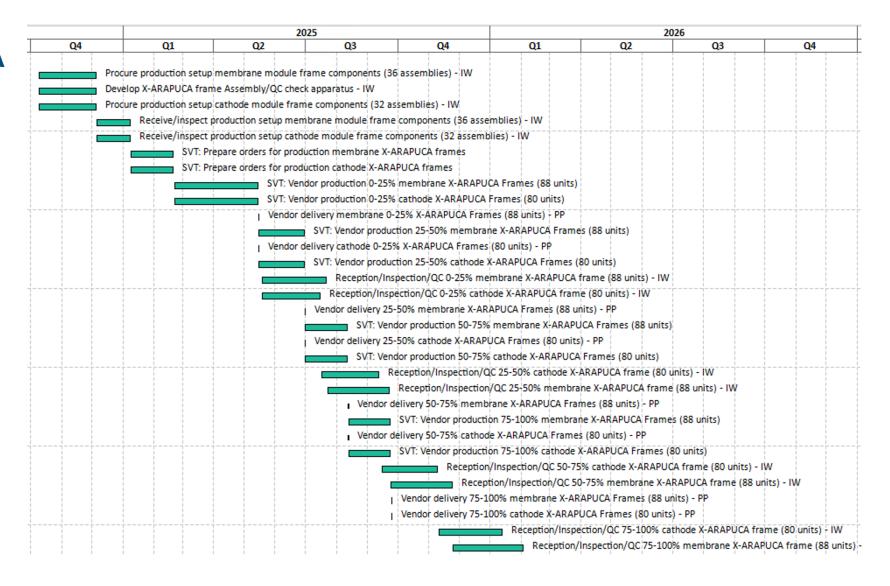
Dichroic Filters



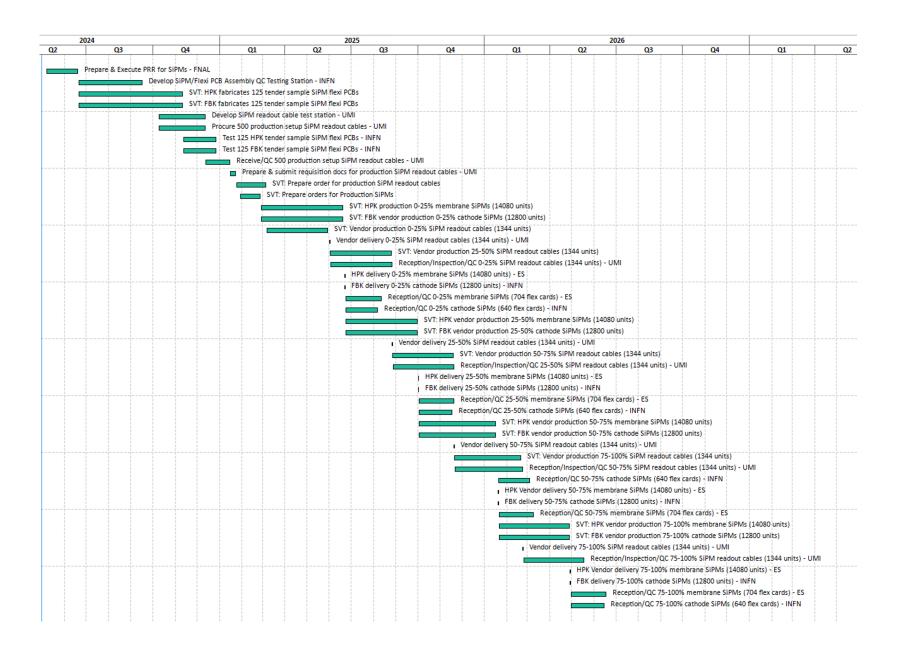
WLS

		20:	25		2026						
Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4			
Proc	ure 32 Production Se	tup WLS Plates - INFN									
Dev	elop WLS Plate QC Te	sting Station - INFN									
	Test 32 Produ	ction Setup WLS Plate	s - INFN								
		SVT: Prepare orders for	Production WLS P	lates							
		SVT: Vendor	production 0-25% \	WLS Plate				ii			
	-	Vendor deliv	ery 0-25% WLS Pla	te - INFN							
		SVT: Vend	dor production 25-5	0% WLS Plate							
			elivery 25-50% WL								
			· 1	50-75% WLS Plate							
	ł		or delivery 50-75%								
		1 1 1 1	1 1	ion 75-100% WLS Plate							
				100% WLS Plate - INFN							
		'	1 1	eption/Inspection/QC 0-	DESCRIPTION OF THE OWNER O	EN					
			Rec	- 1 - 1 - 1 - 1 - 1 - 1 - 1							
				Reception/Inspection/Q							
				 Reception/Inspectio 							
				Reception/Inspe	ction/QC 75-100% V	WLS Plate - INFN					

X-ARAPUCA Frames



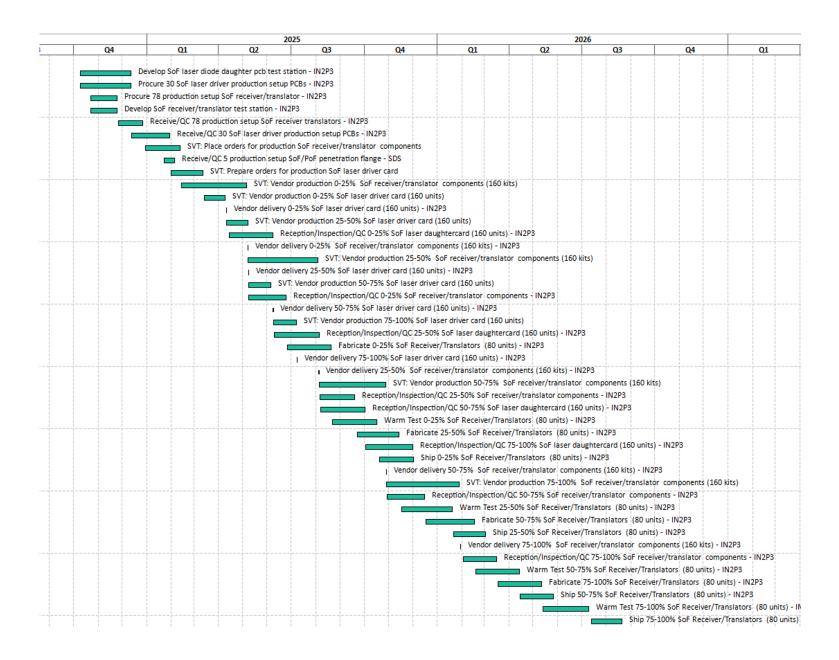
SiPMs/ Flexes



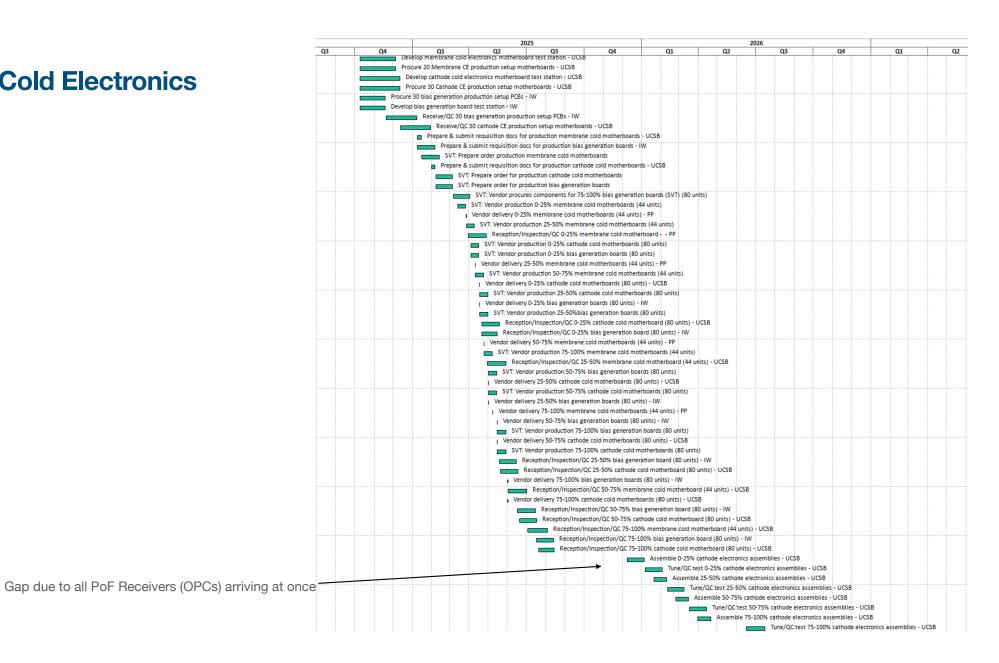
PoF

Q4	Q1	Q2	025 Q3	Q4	Q1	Q2	026	Q4	Q1	Q2	027 Q3	04	Q1
-	44				44	- 42	-		44		40		
	\rightarrow	Develop PoF Receiver											
_	\rightarrow	Procure 90 PoF receiv	er production setup red	eiver - SDS									
_		Procure 8 production s	etup PoF transmitter r	nodules components	s kits - FN								
_	+	Develop PoF transmis		test station - FN									
_		F/SoF fiber test stand -											
		ion setup PoF fibers - SI											
		on setup SoF/PoF fiber f											
		ive/QC 195 production s											
		QC 5 production setup											
	■ Pre	pare & submit requisition			- SB								
	_		r for production PoF fi										
			duction Setup PoF tran										
		Receive/QC 90	PoF receiver production										
					fiber assemblies (240	units)							
			oduction Setup PoF tra										
			mit requsition docs fo										
			Prepare order for pro										
			& submit requisition										
			SVT: Prepare order						ļļļ			ļļļ	
					production 0-100% Po								
			Manday deller		Vendor production 100		ouule components						
			vendor deliver		semblies (240 units) - or production 25-50% P		(240 units)						
							240 units)						
			кесер		1-25% PoF fiber assem								
					very 0-100% PoF receivery 0-10		(240						
					livery 25-50% PoF fiber								
				vendor dei			5% PoF fiber assembli	se (240 unite)					
					eception/Inspection/Q			:s (240 units)					
							omponents kits (320 kit	e) ene	ļ			ļļi	
				Vendo			ransmitter module com						
						* 1	oF receiver (240 units) -						
				_			oF transmitter module						
							50% PoF transmitter m		sns				
							0-75% PoF receiver (72		303				
							/QC 50-75% PoF transr	r i					
							fiber assemblies (240						
					100		: Vendor production 75		mblies (240 units)				
							on/QC 75-100% PoF re						
							on/QC 50-75% PoF fiber				-		
							spection/QC 75-100% F		lle - SDS				
					- I		Warm Test 0-25% Po						
							Fabricate 25-50% Po		1 1 1 1				
							dor delivery 75-100% P						
							Reception/Inspect				 		
									dules to SURF storag				
									oF transmitter modul		S		
									F transmitter module				
									of Cavern PoF Laser S				
									% PoF transmitter mo		e (20 modules) - SDS		
									Warm Test 50-75% Po				
									Fabricate 75-100% Po				
							1 1 1 7					ge (20 modules) - SB	
												ules (20 modules) - SD	os
							111	-				odules to SURF storag	
									-		Transmitter Modules		
											PoF Transmitter Mo		
										- 1	5% PoF Transmitter N		
										Ī			
			ii							Install 75	-100% PoF Transmitte	er Modules - PP	

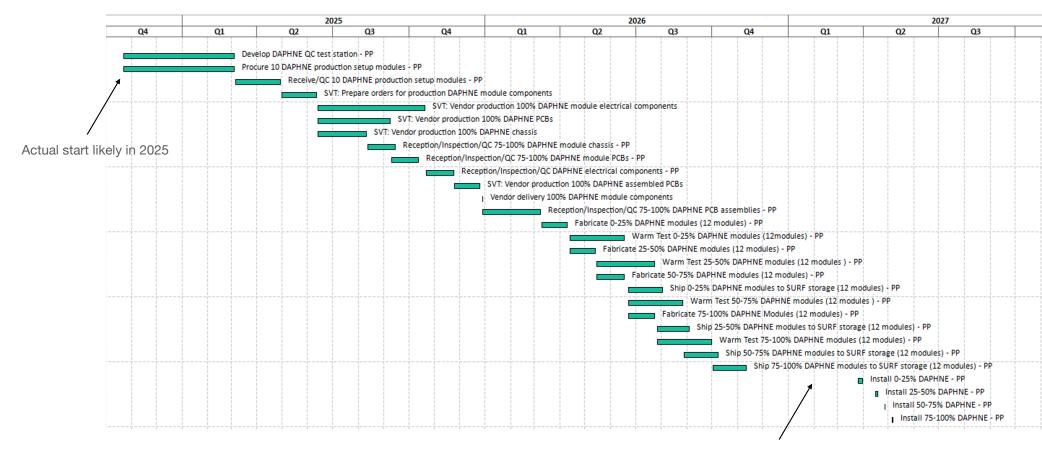
SoF



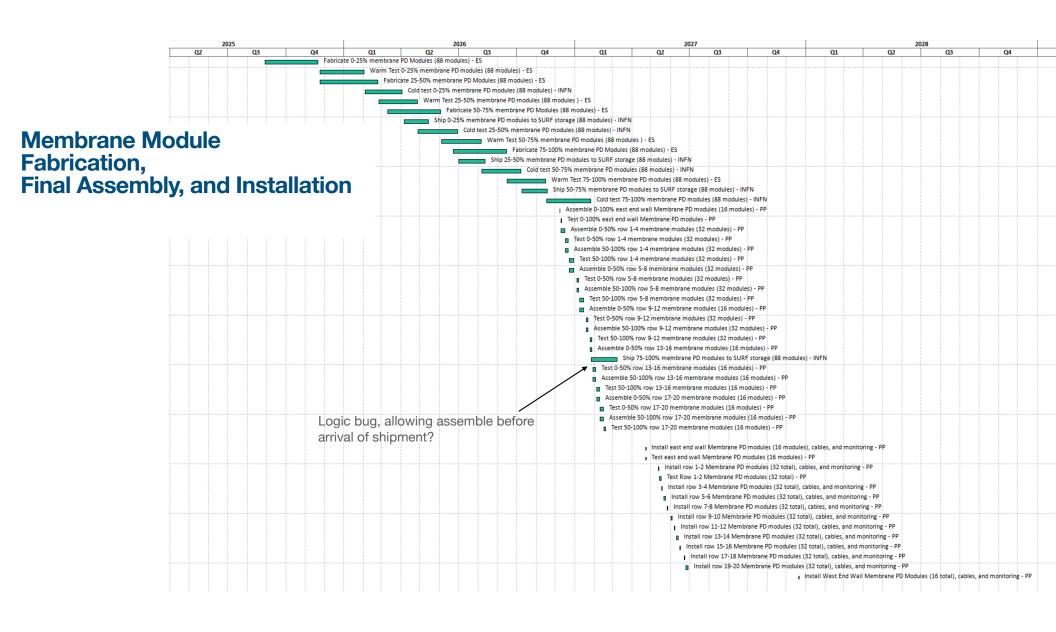
Cold Electronics



DAPHNE



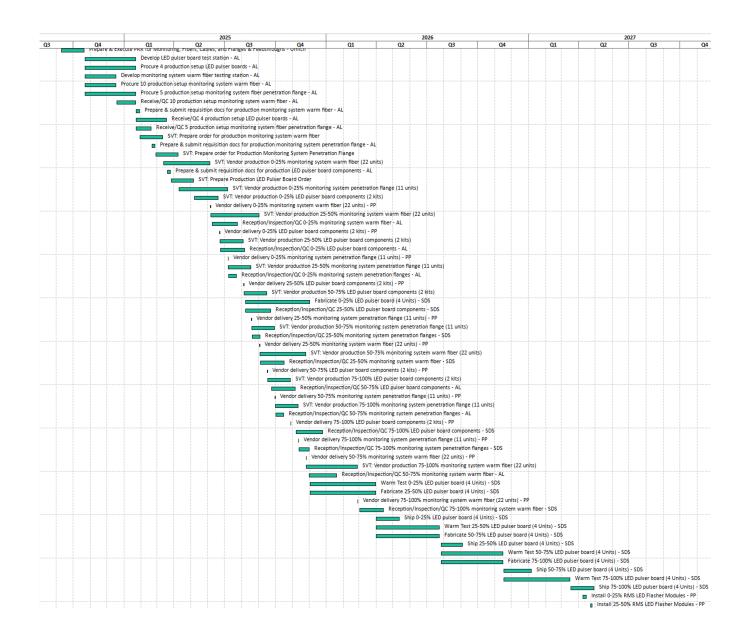
Sufficient float to accommodate delayed start



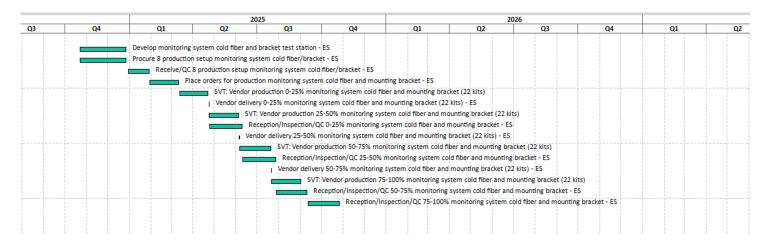
Cathode Module Final Assembly & Installation

Cold test 50-75% cathode PD modules (80 modules) Warm Test 75-100% cathode PD modules (80 modules) - NI Ship 50-75% cathode PD modules to SURF storage (80 modules) Assemble 16 PD cathode modules for superstructures 1-2 (total 16/320) - PP Assemble 24 PD cathode modules for superstructure 3 (total 40/320) - PP Test 16 PD cathode modules for superstructures 1-2 (total 16/320) - PP Assemble 24 PD cathode modules for superstructure 4 (total 64/320) - PP Test 24 PD cathode modules for superstructure 3 (total 40/320) - PP Assemble 24 PD cathode modules for superstructure 5 (total 88/320) - PP Test 24 PD cathode modules for superstructure 4 (total 64/320) - PP Assemble 24 PD cathode modules for superstructure 6 (total 112/320) - PP Test 24 PD cathode modules for superstructure 5 (total 88/320) - PP Test 24 PD cathode modules for superstructure 6 (total 112/320) - PP Cold test 75-100% cathode PD modules (80 modules) - CS Assemble 24 PD cathode modules for superstructure 7 (total 136/320) - PP Test 24 PD cathode modules for superstructure 7 (total 136/320) - PP Assemble 24 PD cathode modules for superstructure 8 (total 160/320) - PP Test 24 PD cathode modules for superstructure 8 (total 160/320) - PP Assemble 24 PD cathode modules for superstructure 9 (total 184/320) - PP Test 24 PD cathode modules for superstructure 9 (total 184/320) - PP Assemble 24 PD cathode modules for superstructure 10 (total 208/320) - PP Test 24 PD cathode modules for superstructure 10 (total 208/320) - PP Assemble 24 PD cathode modules for superstructure 11 (total 232/320) - PP ■ Test 24 PD cathode modules for superstructure 11 (total 232/320) - PP Ship 75-100% cathode PD modules to SURF storage (80 modules) - CS Assemble 24 PD cathode modules for superstructure 12 (total 256/320) - PP Assemble 24 PD cathode modules for superstructure 13 (total 280/320) - PP Test 24 PD cathode modules for superstructure 12 (total 256/320) - PP Assemble 24 PD cathode modules for superstructure 14 (total 304/320) - PP Pause in assembly due to last shipment of dichroics Test 24 PD cathode modules for superstructure 13 (total 280/320) - PP Assemble 16 PD cathode modules for superstructure 15-16 (total 320/320) - PP Test 24 PD cathode modules for superstructure 14 (total 304/320) - PP Test 16 PD cathode modules for superstructure 15-16 (total 320/320) - PP Perform connections for Cathode PD Modules of superstructure 1 - PP Test cathode PD modules of superstructure 1 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 2 - PP Test cathode PD modules of superstructure 2 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 3 - PP Test cathode PD modules of superstructure 3 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 4 - PP ■ Test cathode PD modules of superstructure 4 after connection and positioning - PF Perform connections for cathode PD modules of superstructure 5 - PP n Test cathode PD modules of superstructure 5 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 6 - PP Test cathode PD modules of superstructure 6 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 7 - PP Test cathode PD modules of superstructure 7 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 8 - PP Test cathode PD modules of superstructure 8 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 9 - PP Test cathode PD modules of superstructure 9 after connection and positioning - PF Perform connections for cathode PD modules of superstructure 10 - PP Test cathode PD modules of superstructure 10 after connection and positioning - PF Perform connections for cathode PD modules of superstructure 11 - PP Test cathode PD modules of superstructure 11 after connection and positioning - PF Perform connections for cathode PD modules of superstructure 12 - PP Test cathode PD modules of superstructure 12 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 13 - PP Test cathode PD modules of superstructure 13 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 14 - PP Test cathode PD modules of superstructure 14 after connection and positioning - PF Perform connections for cathode PD modules of superstructure 15 - PP Test cathode PD modules of superstructure 15 after connection and positioning - PP Perform connections for cathode PD modules of superstructure 16 - PP Test cathode PD modules of superstructure 16 after connection and positioning - PP

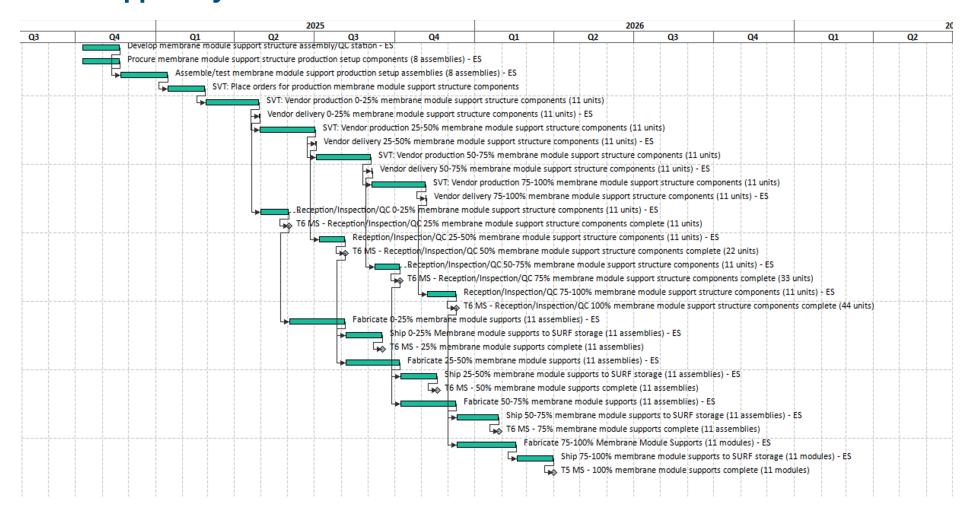
Monitoring System - Warm Side



Monitoring System - Cold Side



Membrane Support System

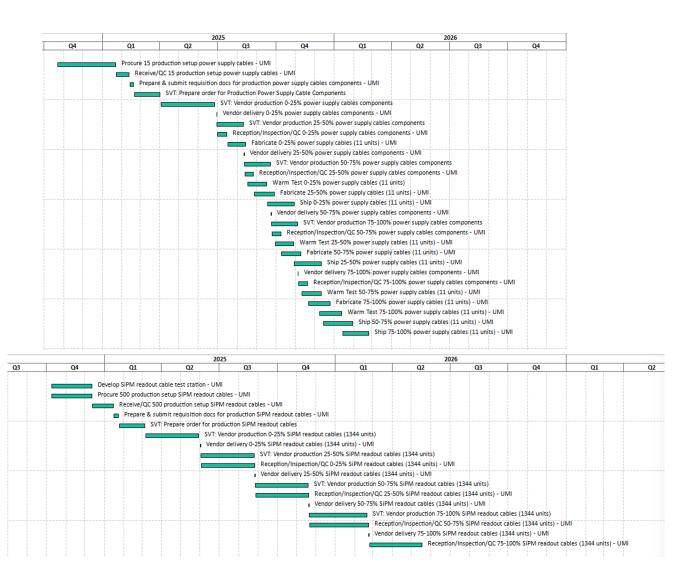


Membrane Cables

04	01	02	2023	03	Q4	01	02	2026 Q3	Q4	01
mbrane Cables (8 cables) for C	ERN I&I test - CS	· · · ·	+ + +	ųs .	Ų4	- QI	Ų2	ųs –	Q4	QI
Devel	op membrane cable tes	st station - CS								
	re 38 production setup		cables - CS							
	re 38 production setup									
	Membrane Cable Feedti									
	re 10 production setup			abe - LIMI						
	eive/QC 38 production s			- :						
	eive/QC 38 production s									
	eive/QC 10 production s									
					cables components - C					
□ Pr					ne cables components -	CS				
	SVT: Place orde									
					Cables Components					
	SVT: \				ole Feedthroughs - UMI					
					d membrane cables co					
					rm membrane cables o	omponents (88 kits)				
					throughs (80 units) - IU					
		Reception/Insp	ection/QC	0-100% Mer	mbrane Cable Feedthro	igh - UMI				
		Vendor de	livery 0-259	% cold mem	brane cables componer	ts (88 kits) - CS				
			SVT: Vendo	r production	25-50% cold membran	e cables component	s (88 kits)			
		Vendor de	livery 0-259	% warm me	mbrane cables compon	ents (88 kits) - CS				
			SVT: Vendo	r production	25-50% warm membra	ne cables compone	nts (88 kits)			
					% cold membrane cable					
		Recepti	ion/Inspecti	ion/QC 0-25	% warm membrane cal	oles components - C	s			
			Fabricate 0)-25% cold n	nembrane cables (88 ur	its) - CS				
					membrane cables (88					
					cold membrane cable		rs) - CS			
					production 50-75% cold			kits)		
					warm membrane cabl			N.C.		
		-			production 50-75% war			Q kital		
		_			5% cold membrane cab		s components (o	o NG)		
					5% warm membrane ca					
			_							
					on/QC 25-50% cold men					
					n/QC 25-50% warm me					
					5-50% cold membrane of					
					5-50% warm membrane		US .			
					cold membrane cables					
					0-25% warm membran					
			11.		ery 50-75% cold memb	1 1 1	1 1 1			
					T: Vendor production 75					
			- 1		ery 50-75% warm men		1 1 1			
					T: Vendor production 75			ponents (88 kits)		
					n Test 25-50% cold mer					
				Warr	n Test 25-50% warm m	embrane cables (88	units) - CS			
				Reception	/Inspection/QC 50-75%	cold membrane cal	oles components	- CS		
				Reception	/Inspection/QC 50-75%	warm membrane o	ables componen	ts - CS		
			- T	Fa	bricate 50-75% cold m	embrane cables (88	units) - CS			
				Fa	bricate 50-75% warm	membrane cables (8	8 units) - CS			
					Ship 25-50% cold	membrane cables (8	8 units) - CS			
					Ship 25-50% warn					
				. Ve	endor delivery 75-100%			(88 kits) - CS		
					endor delivery 75-100%					
				V	Warm Test 50-759					
					Warm Test 50-759					
					Reception/Inspection/					
					Reception/Inspection/					
						10% cold membrane				
						10% warm membrar	i i i i	· i i i		
						75% cold membrane				
					Ship 50-	75% warm membra	ne cables (88 un	its) - CS		
					Warm To	est 75-100% cold me	mbrane cables	(88 units) - CS		
					Warm To	est 75-100% warm r	nembrane cable	s (88 units) - CS		
						Shin 75-100% co	old membrane ra	bles (88 units) - CS		

Power Supply Cables

SiPM Cables



Flanges & Feedthroughs



Shipping

- Most shipping included perhaps overly conservative in places.
- 30 days (6 weeks) for Europe-to-SURF.
 - Delicate, high-value items.
- Missing shipping most items from US to Spain, Italy to Spain
 - As unassembled items, durations should be short enough not to have a significant schedule impact.