

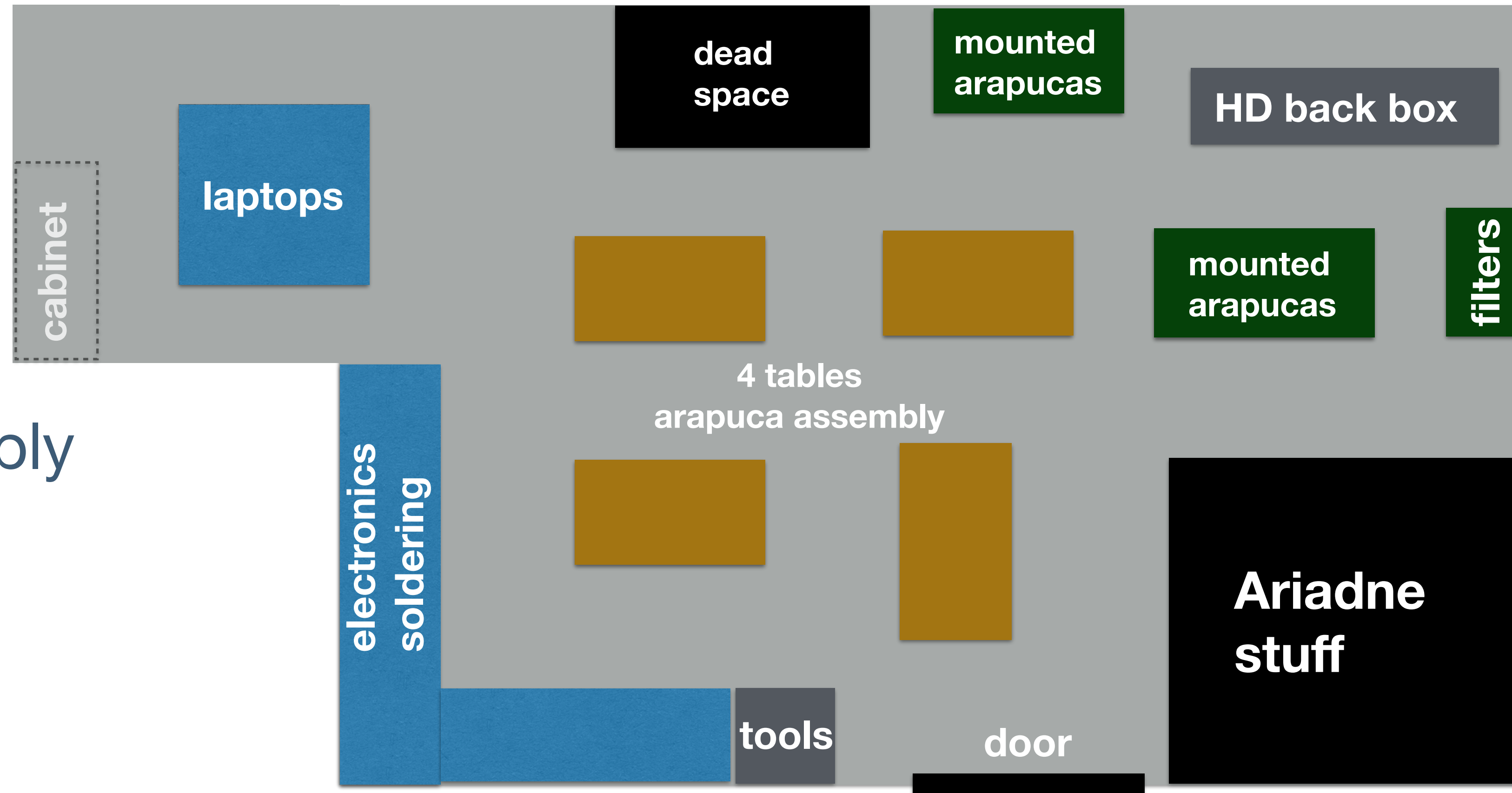
ProtoDUNE-VD PDS installation schedule

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Version 8

PDS room at CERN

- Ambient light removed
 - Windows covered
 - Yellow light installed
- Currently four tables for tables for arapuca assembly
- Tooling
- Storage areas
- Cabinet requested
- Soldering station
- Should get rid of Ariadne stuff



below control rooms in mezzanine

PDS room at CERN



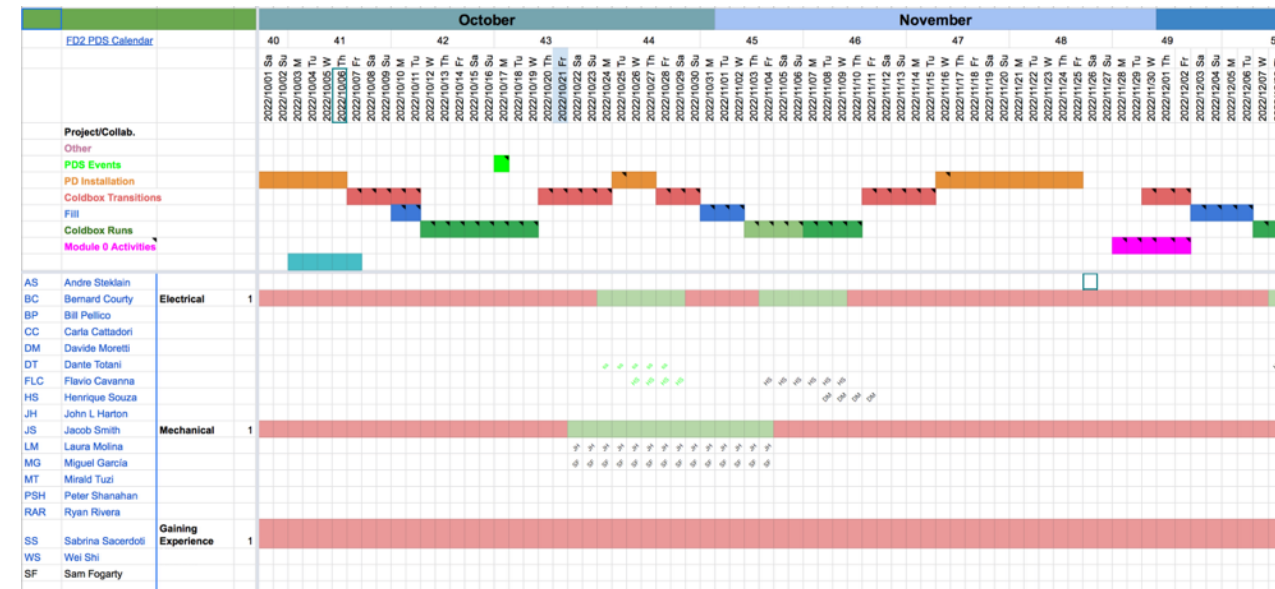
Courtesy of Jay

People at CERN

- A single spreadsheet for cold boxes and Module-0

https://docs.google.com/spreadsheets/d/1qT_wY5rvEtjS2t741bd8TGejxSAtKZIWIWu3m8GozzA/edit?usp=sharing

- People traveling to CERN and willing to help should fill it



- Several teams (4?) need to be configured to ensure we can assemble 4 modules in parallel if needed
- Some people would have to be trained
- Ongoing planning

News on schedule since last meeting

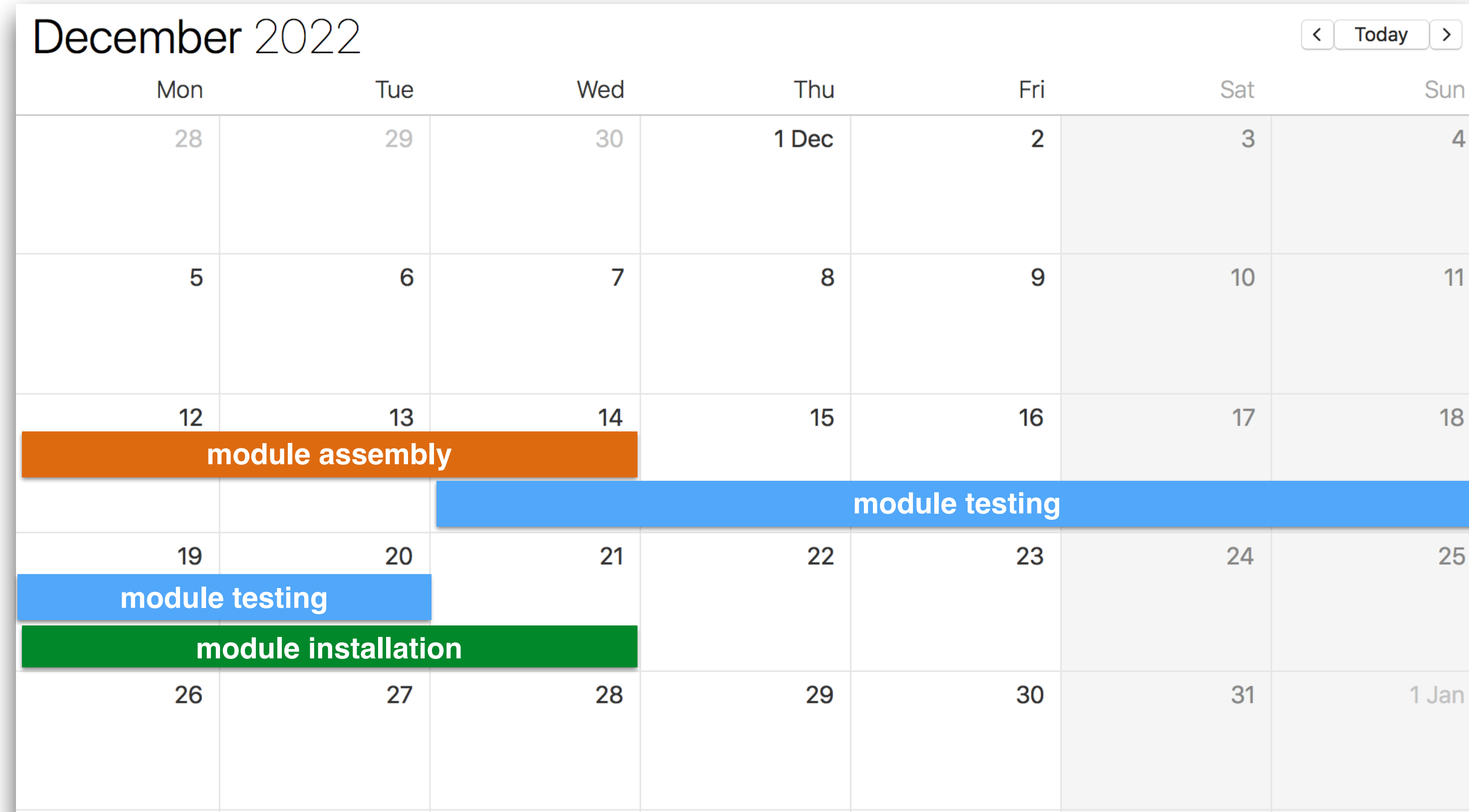
- Schedule with dates presented by Filippo on Wednesday
 - Not very different from what we presented last week
- Most items on critical path ordered with delivery date within schedule
 - No major delays identified
 - See talk by Ryan
- Plan is to advance as much as possible X-Arapuca assembly such that we have more time for integrated tests in cold (see talk by Flavio)

New in this version

- Installation of supports for membrane modules postponed to Dec. 12th
- Installation of upstream top modules stays as planned: Dec 12th-20th
- Installation on first cathode stays as planned: Jan 9th-20th
- Installation of top downstream modules decoupled from top upstream modules: moved to week of Jan 23rd. If moved 3-4 days we could use second batch of filters
- Installation on second cathode advances by 1 week, from second to first week of February
 - Will request one more week

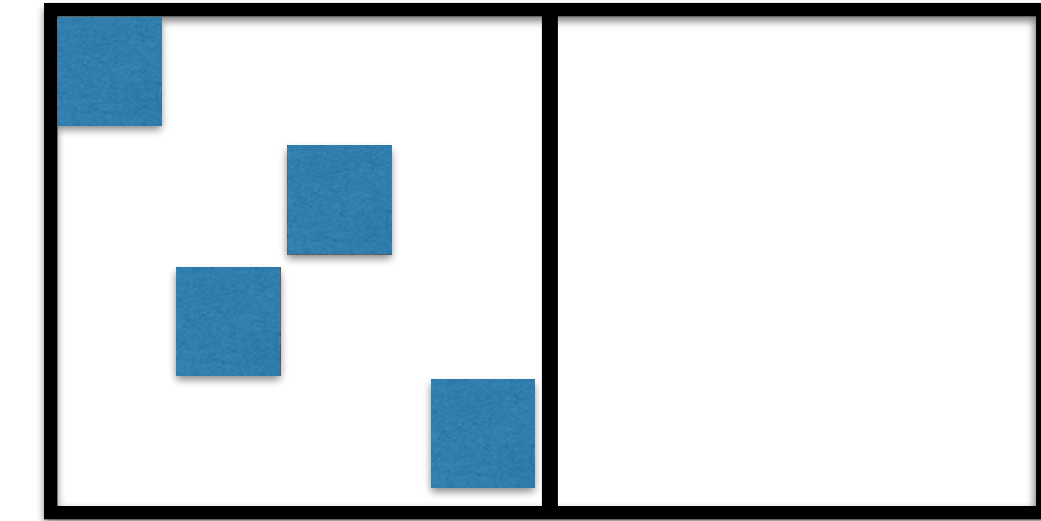
Top upstream membrane

- 2 modules
- 36 97x202 ZAOT filters
- 320 HPK SiPMs
- **Contingency:** If not sufficient time for testing, installation could be delayed to January 9th with no impact on overall schedule

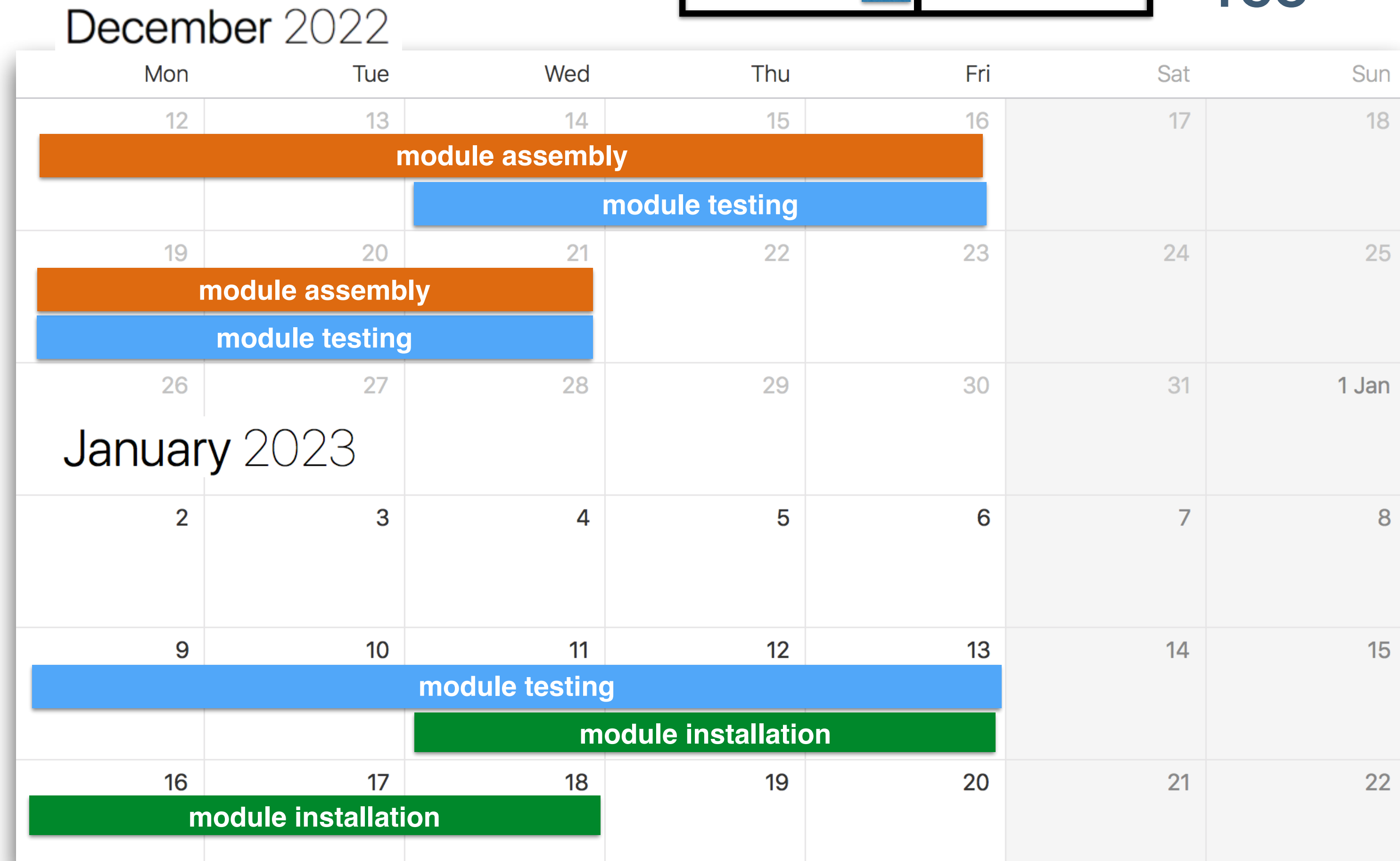


Upstream cathode

- 4 modules
- 72 97x202 ZAOT filters
- 64 150x150 PE filters
- 480 HPK SiPMs
- 160 FBK SiPMs
- **Contingency:** sufficient time for all operations
- Class-4 laser test the week after

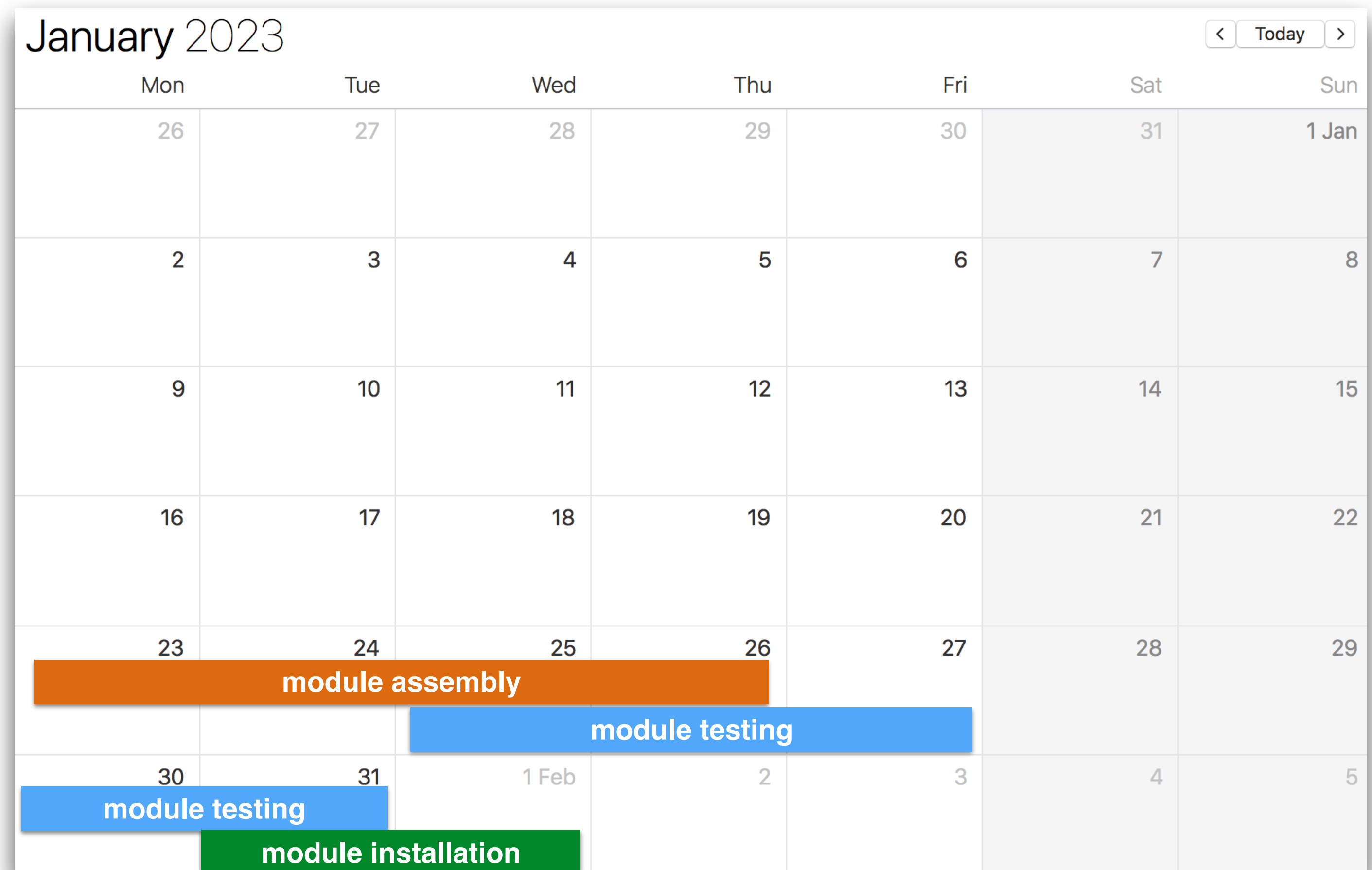


TCO



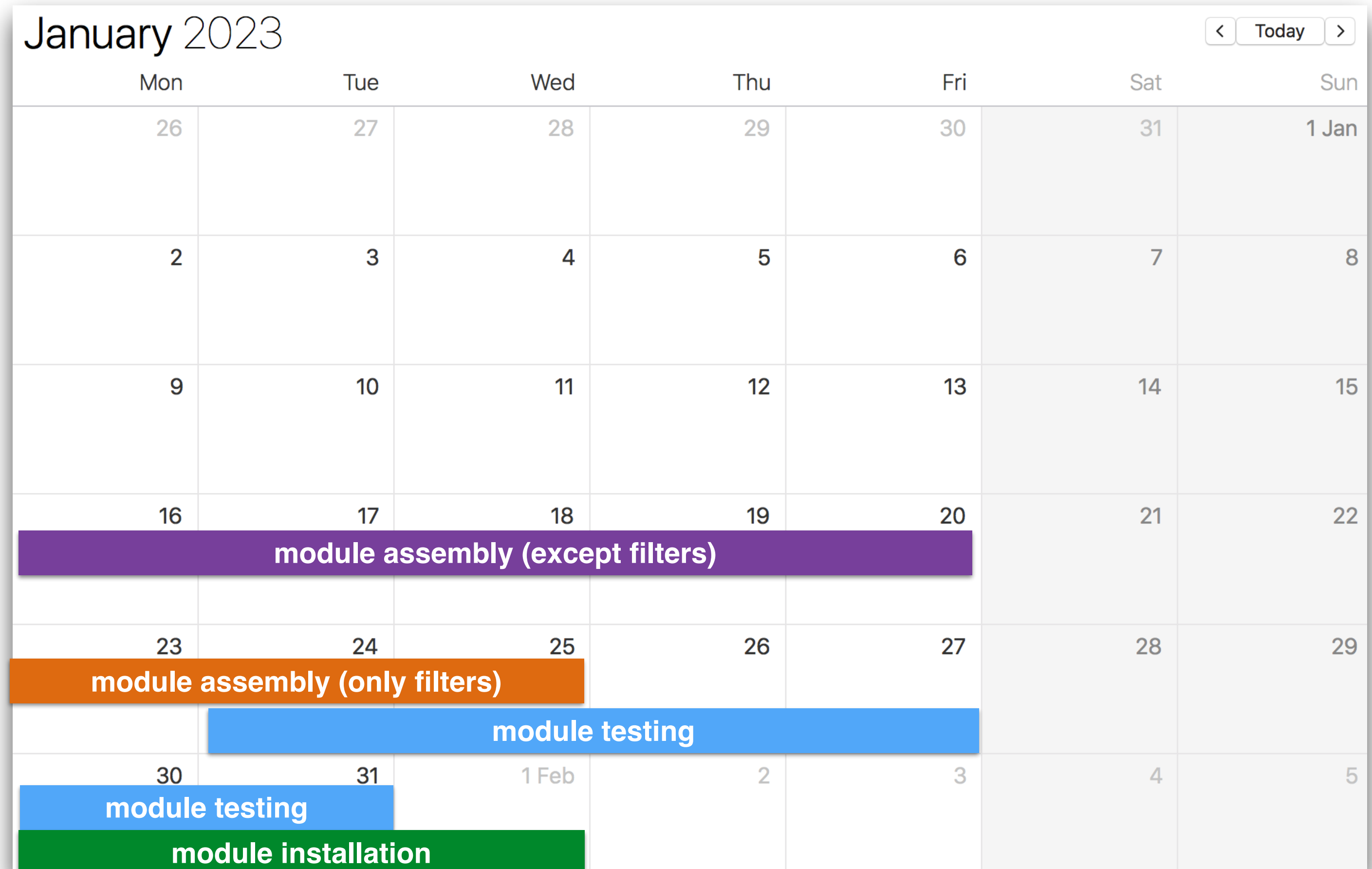
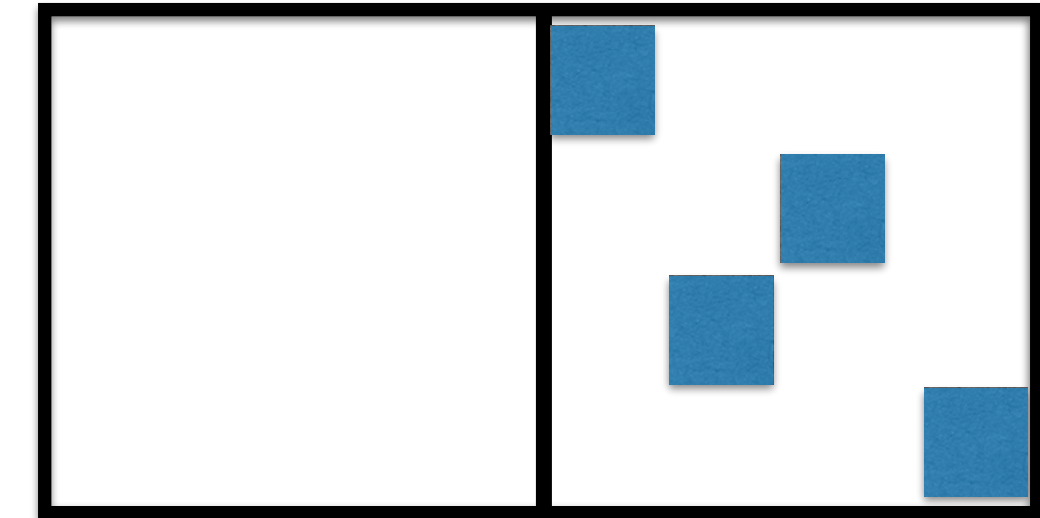
Top downstream membrane

- 2 modules
- 32 150x150 ZAOT filters
- 32 150x150 PE filters
- 320 HPK SiPMs
- **Contingency:** sufficient time for all operations. But, if needed, delaying installation to Feb 2-3 should be OK. Will check with Filippo



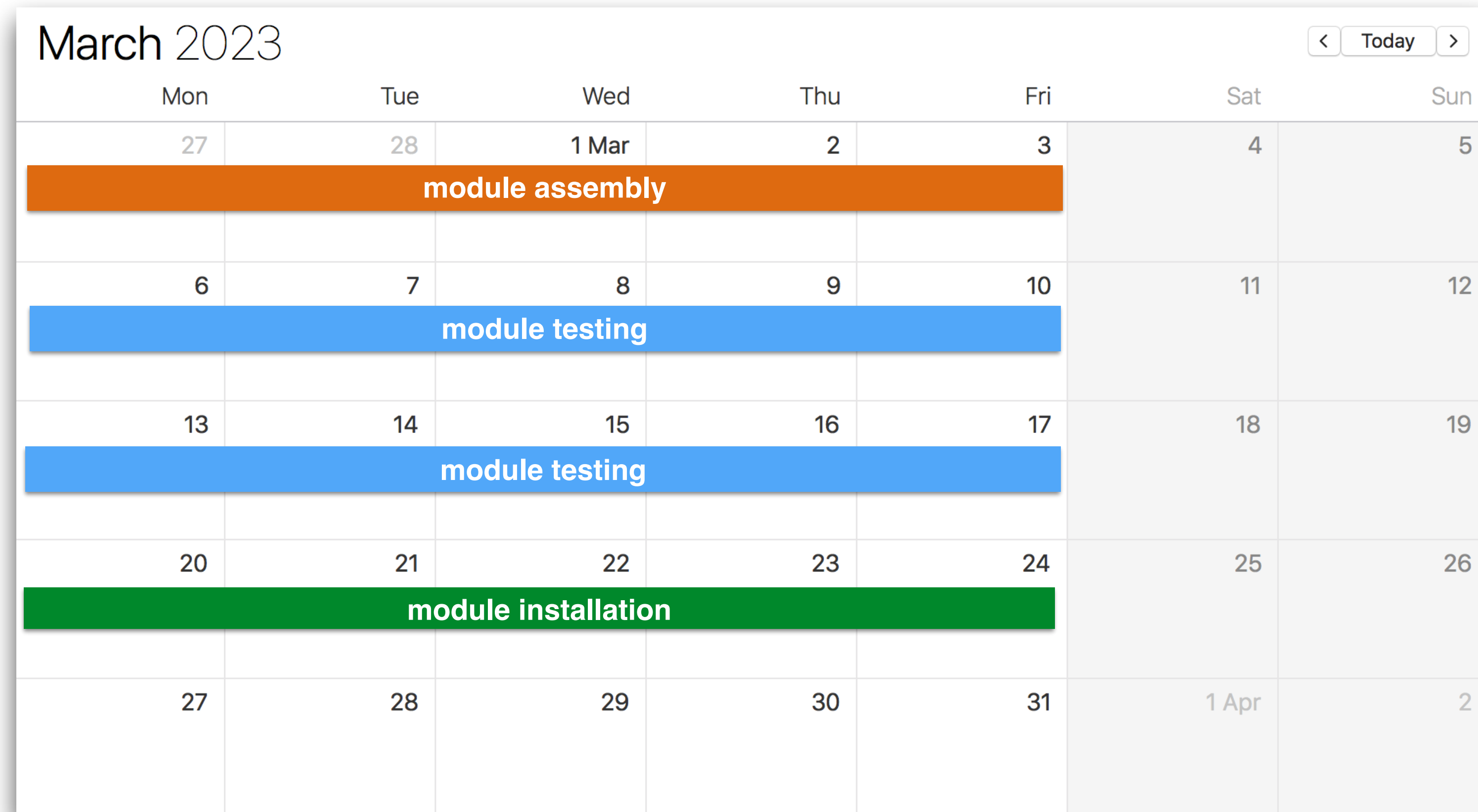
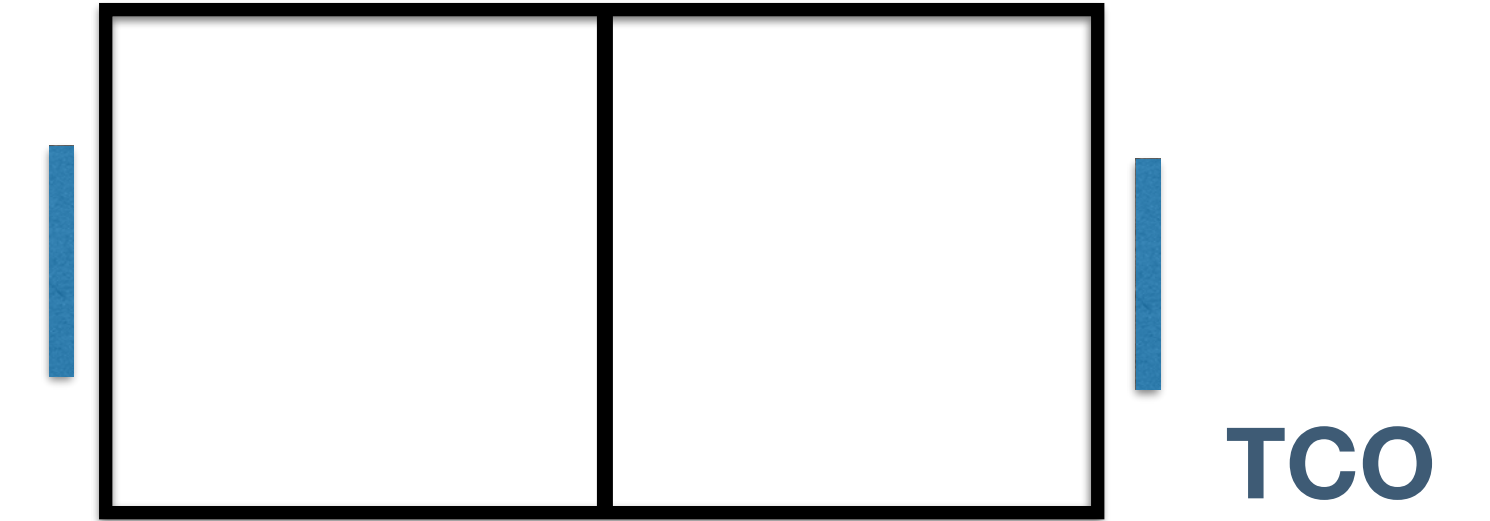
Downstream cathode

- 4 modules
- 64 150x150 ZAOT filters
- 64 150x150 PE filters
- 640 HPK SiPMs
- **Contingency:** not enough time for testing. Will request one more week
- Class-4 laser test the week after



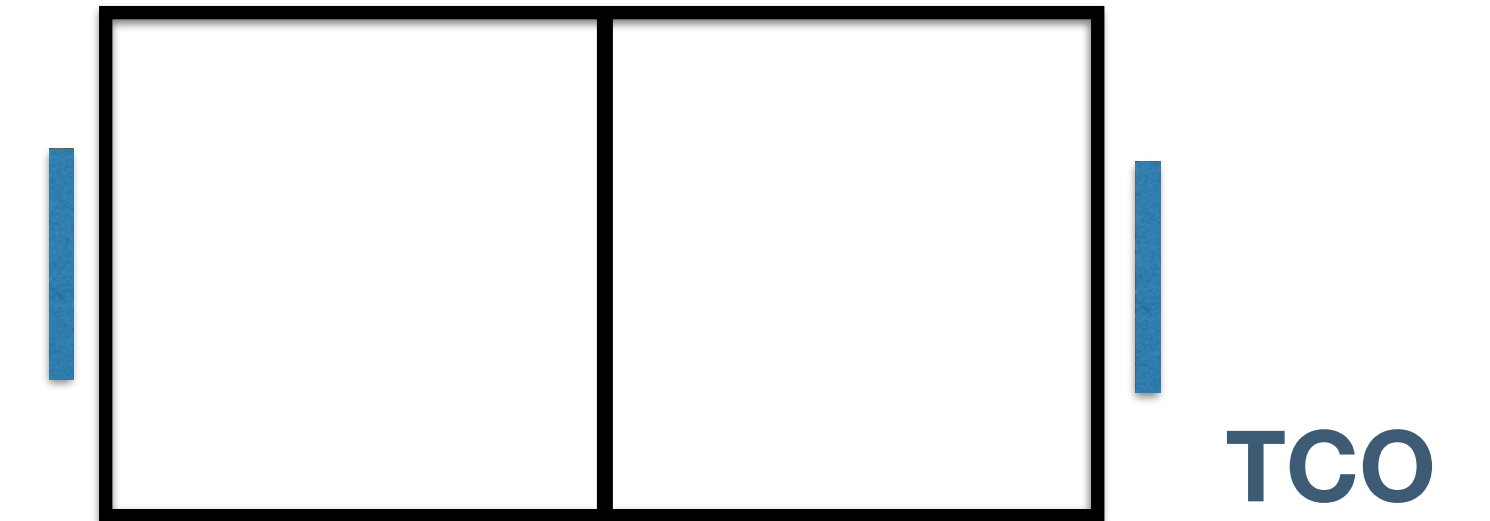
Bottom membrane, temporary

- 4 modules
- temporary 97x200 & 97x97 filters reused from cold boxes
- 320 HPK SiPMs
- 320 FBK SiPMs
- **Contingency:** sufficient time for all operations



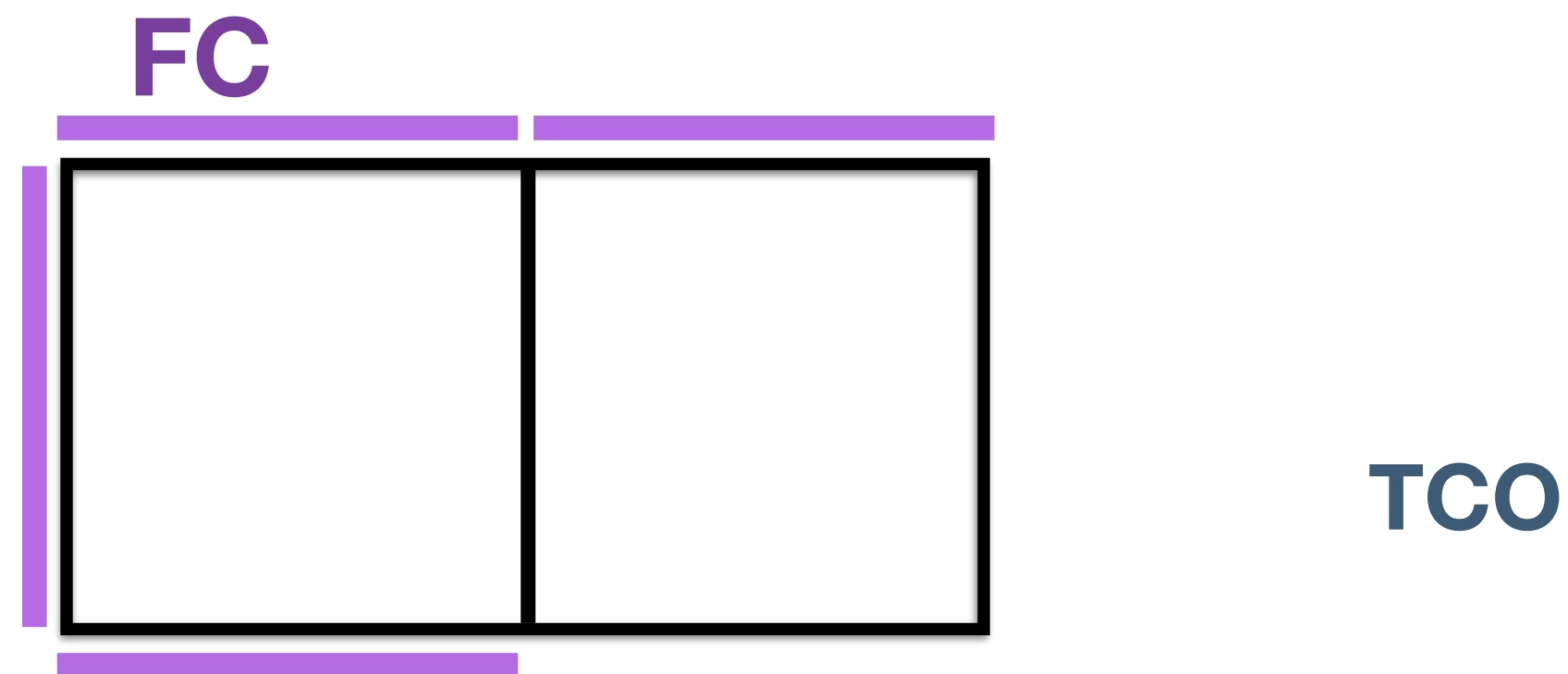
Bottom membrane, final

- Replace modules
- State of the art components
 - Optimized filters (size and transmission)
 - Optimized frame (ribless ?, gapless ?)
 - Optimized electronics
- Time to install them until TCO closing, or even later since the module fits through man hole



Access to second cathode

- Last two FC walls installed the week of April 3rd to allow for downstream bottom CRP installation
- This will be installed the week of march 13th
- We have time until then to replace things in the downstream cathode, installed moth earlier
- We could event install FBK (arriving mid February) on that cathode if we find the way of doing it with cathode in place



Overall schedule (v9)

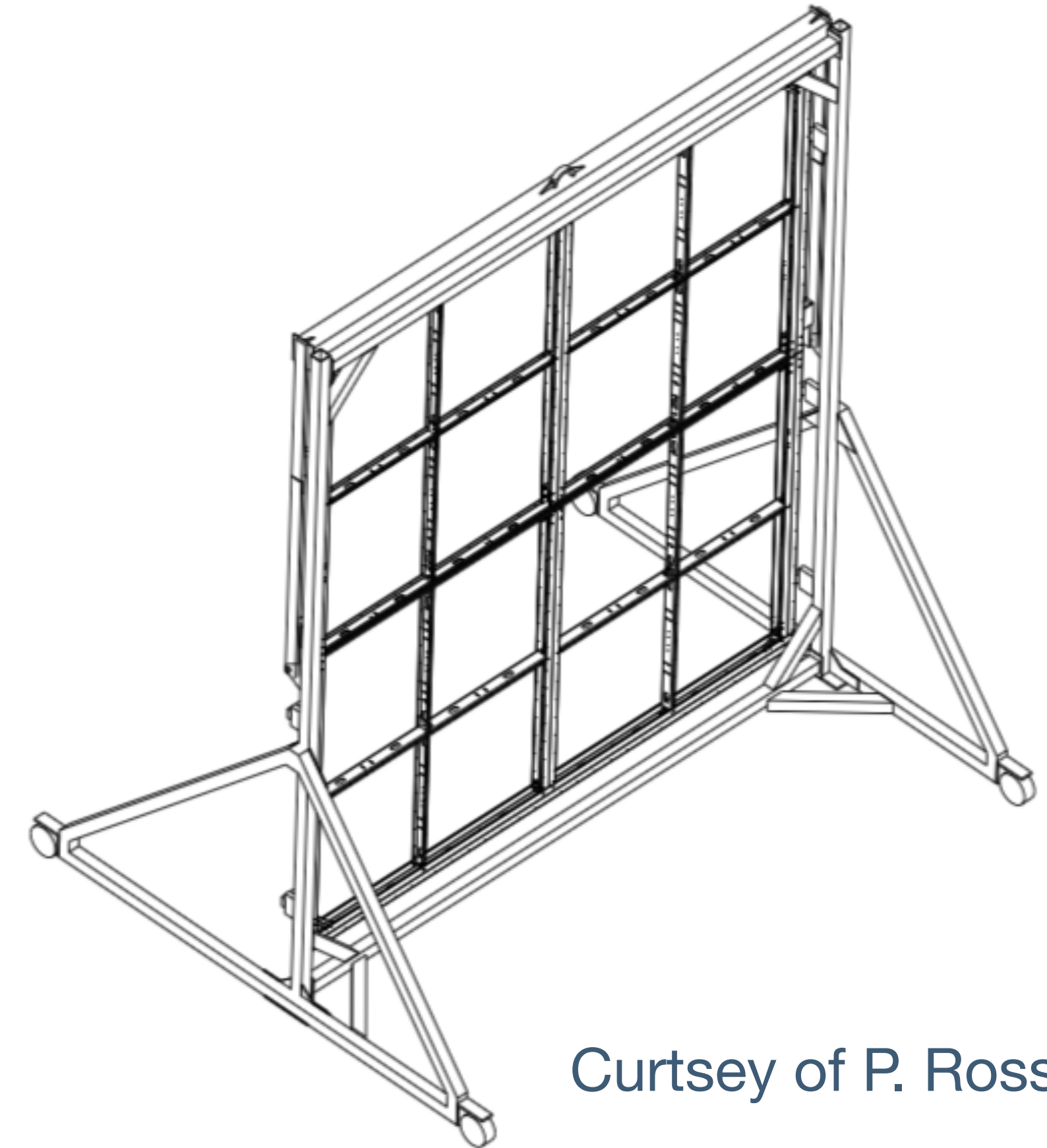
- No time to update it
- Available at

https://docs.google.com/spreadsheets/d/16nfmql-3RYNQ7bn_x3v6cbq3mM2XgKXS5wuyRzTw490/edit?usp=sharing

backup

Cathode availability for PDS

- Cathode available on cartwall for PDS installation from Dec 14th week of January 16th
- We have a complete week after Christmas to mount 4 modules and install them in cathode



Curtsey of P. Rossier

- The displayed date is Friday and refers to the end of the activity
- At least 5 working days foreseen for each section

	previous version (last meeting)	current version (Filippo's info)	Goal for next version	available working days	comment
top membrane 1	Dec. 12th	Dec. 12th		8 days	
cathode 1	Jan. 9th	Jan. 9th		5 days	Try to get few more days by delaying cathode installation to mid/end of the week after
top membrane 2	Dec. 12th	Jan. 23rd	Jan 30th		Try to get few more days by delaying cathode installation to mid/end of the week after
cathode 2	Feb. 6th	Jan. 23th	Feb 6th	5 days	Try to get few more days by delaying cathode installation to mid/end of the week after
bottom membrane 1 & 2	Feb. 27th	Mar. 20th			Contingency for FBK SiPMs

			October				November				December				January				February				March				
Subsystem			1	2	3	4	1	2	3	4	5	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
PDS	Frame	2 cathode-XA prototype frames for coldbox at CERN (Nov. 18th)																									
Floor		Remove/cut false floor section for downstream membrane XA supports																									
PDS	Mec	Downstream membrane XA supports																									
Floor		Remove/cut false floor section for upstream membrane XA supports																									
PDS	Mec	Upstream membrane XA supports																									
PDS	Cables	4 HD + 4 coax cables from flange to mem. XA pairs (??)																									
PDS	Fibers	Res. & Mon. optical fiber from flange to top of short walls (??)																									
PDS	Dicrhoic	First batch of filters arrives to CERN: 97.5x202 (Dec. 12th)																									
PDS	Frame	4 membrane-XA frames at CERN (for 97.5 X 202 filters) (Dec. 12th)																									
PDS	XA	assembly of 4 membrane XA (97.5 x 202 filters, 640 HPK)																									
PDS	XA	install 2 top downstream membrane XA																									
PDS	XA	install top upstream membrane XA																									
HV		two cathodes arrive to CERN (Dec. 10-12th)																									
HV		downstream cathode available for PDS (Dec. 14th)																									
PDS	Fibers	Install PoF/SoF optical fibers in downstream cathode																									
PDS	Flange	Install PDS flange																									
PDS	Elec	flex to motherboard cables delivered to Fermilab (Jan. 5th)																									
PDS	Frame	4 cathode-XA frames at CERN (2 for 97.5 X 202, 2 for 150x150) (Jan. 9th)																									
PDS	XA	all components for 4 cathode modules at CERN (Jan. 9th)																									
PDS	XA	assembly of 4 cathode XA (filter size (?), 480 HPK, 160 FBK)																									
PDS-HV	XA	installation of 4 XA in downstream cathode																									
HV		Cathode mesh at CERN ready for installation (Jan. 16th)																									
CRP-HV		Top Downstream CRP + cathode assembled and lifted																									
PDS	Fibers	Install PoF/SoF optical fibers in upstream cathode																									
PDS	Frame	4 cathode-XA frames at CERN (2 for 97.5 X 202, 2 for 150x150) (Jan. 16th)																									
PDS	Dicrhoic	Second batch of filters arrives to CERN (Jan. 23rd)																									
PDS	XA	all components for 4 cathode module at CERN (Jan. 23rd)																									
PDS	XA	assembly of 4 upstream cathode XA (150x150 filters, 640 HPK)																									
PDS-HV	XA	installation of 4 XA in upstream cathode																									
CRP-HV		Top Upstream CRP + cathode assembled and lifted																									
Floor		Remove false floor section for bottom downstream CRP																									
CRP		Bottom Downstream CRP																									
Floor		Remove false floor section for bottom upstream CRP																									
CRP		Bottom Upstream CRP																									
HV		Field cage installation																									
PDS	SiPMs	750 FBK SiPMs mounted and tested arrive to CERN (Feb. 15th)																									
PDS	Dicrhoic	Third batch of filters arrives to CERN (Summer)																									
PDS	XA	assembly of 4 membrane XA (filter size?, 320 HPK, 320 FBK)																									
PDS	XA	installation of 2 bottom downstream membrane XA																									
PDS	XA	installation of 2 bottom upstream membrane XA																									

membrane
 ↓
 1st batch of filters

1st cathode
 ↓

2nd batch of filters
 2nd cathode
 ↓

FC
 ↓

FBK SiPMs
 3rd batch of filters

membrane
 ↓

• PDS requests

- Bring in, assemble and lift the field cage support structure -> Week of 28th of November
- Install the vertical cable trays and the PDs supports on the walls -> Week of 5th of December **Move to Dec. 12th. Install also monitoring fibers and copper cables**
- Install of top PD system on the upstream wall -> Week of 5th of December. If the cathode is not installed, the PDs can be installed after the CRP is installed.
- Install the first CRP without cathode in the upstream position -> Week of 12th of December **must be moved to week of Dec. 12th (or even 19th), because frame and filters arrive on Dec. 12th**
- * End of the year break from 22nd of December to 4th of January
- Reposition the SGFTs -> Week of 9th of January
- Install the cathode on first CRP -> Week of 16th of January **OK. Try to delay this to mid/end of that week to get few more days for XA installation in first cathode**
- Connect and test TDE on first CRP -> Week of 23rd of January
- Install the top PD system on the downstream wall -> Week of 23rd of January **OK. By te end of that week since filters arrive the 23rd and we have to assemble two XA**
- Install the second CRP with cathode in the upstream position -> Week of 30th of January **OK. Try to delay this to mid/end of that week to get few more days for assembly of 4 XA and installation on 2nd cathode**
- Connect and test TDE on second CRP -> Week of 6th February
- Install the field cage except the walls to allow bottom CRP installation -> Week of 13th and week of 20th of February
- Install the HV extender and the HV feedthrough -> Week of 20th of February. It can be done later on, it's independent of almost everything
- Install PD and CE penetration connect the cathode and the fibres of the PDs on the cathode -> Week of 27th of February
- Remove and clean part of the false floor install first bottom CRP -> Week of 6th of March
- Install and cable the second bottom CRPs -> Week 13th of March
- Test the BDE -> Week of 20th of March
- Install remaining bottom PD modules on the walls -> Week of 20th of March (can be done earlier)
- Remove the false floor and remove man lift -> Week of 27th of March
- Remove the TCO beam install the last field cage wall and set field cage in final position -> Week of 3rd of April
- Install the instrumentation (and beam plug) -> From the week of 10th of April