

# ProtoDUNE-VD PDS installation schedule

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Version 7

# Goals and prioritisation

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- Aiming for a fully functional system with 16 modules
- Given limited time and resources we should be prepared to prioritise in the case we are forced to install less modules
- There are way too many options and we don't need all possible combinations in Module-0: SiPMs, filters, membrane readout, PoF, etc
- We should elaborate a clear list of goals for Module-0 and a prioritised list of option combinations and distribution of modules for different scenarios (16, 14, 12, 10 and 8 modules)
- The distribution of modules should take into account:
  - Light yield measurements and beam trajectory
  - Overall Module-0 Installation sequence

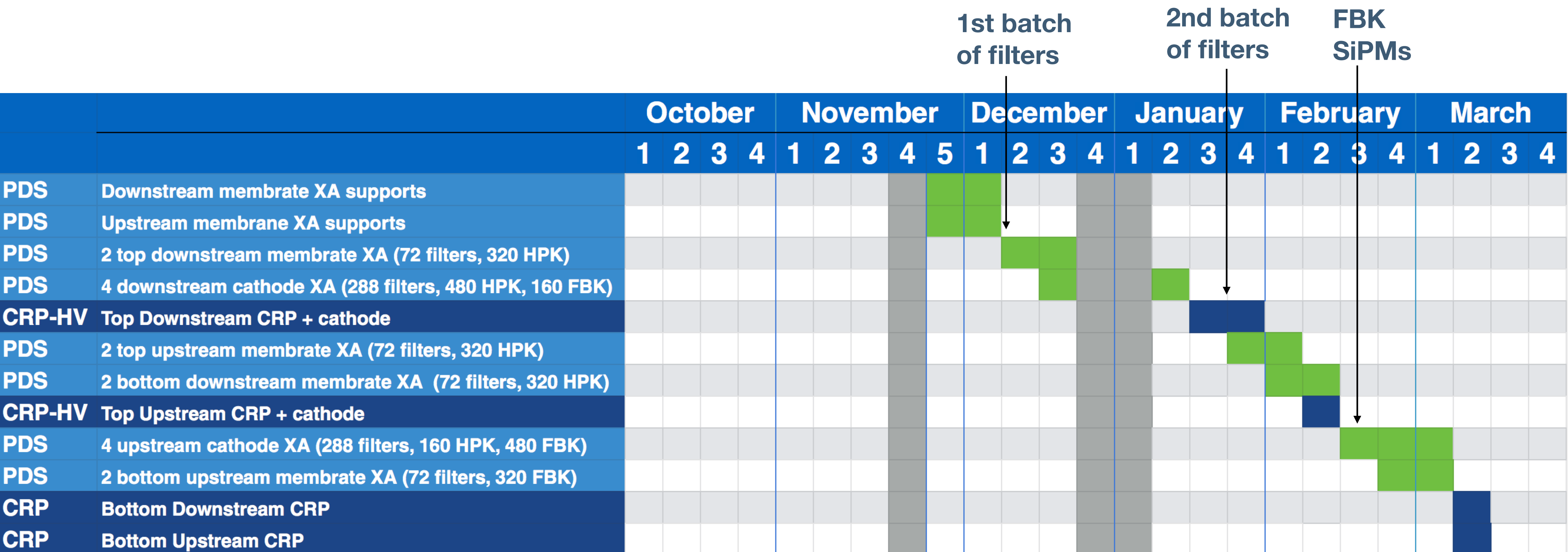
# Considerations

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- Module-0 will be inoperative for about a year
  - We cannot wait a year to have results on some elements
  - Some technological options may become obsolete by that time
- Identify things that must be tested in Module-0 because they cannot be tested anywhere else (e.g. tests needing HV, long time LAr exposure, ...)
- Identify things that would be better tested in test stands or cold boxes

# Schedule presented at integration meeting

- Complain about first CRP+cathode installation in mid/late January, proposed to avoid installation with cathode in place



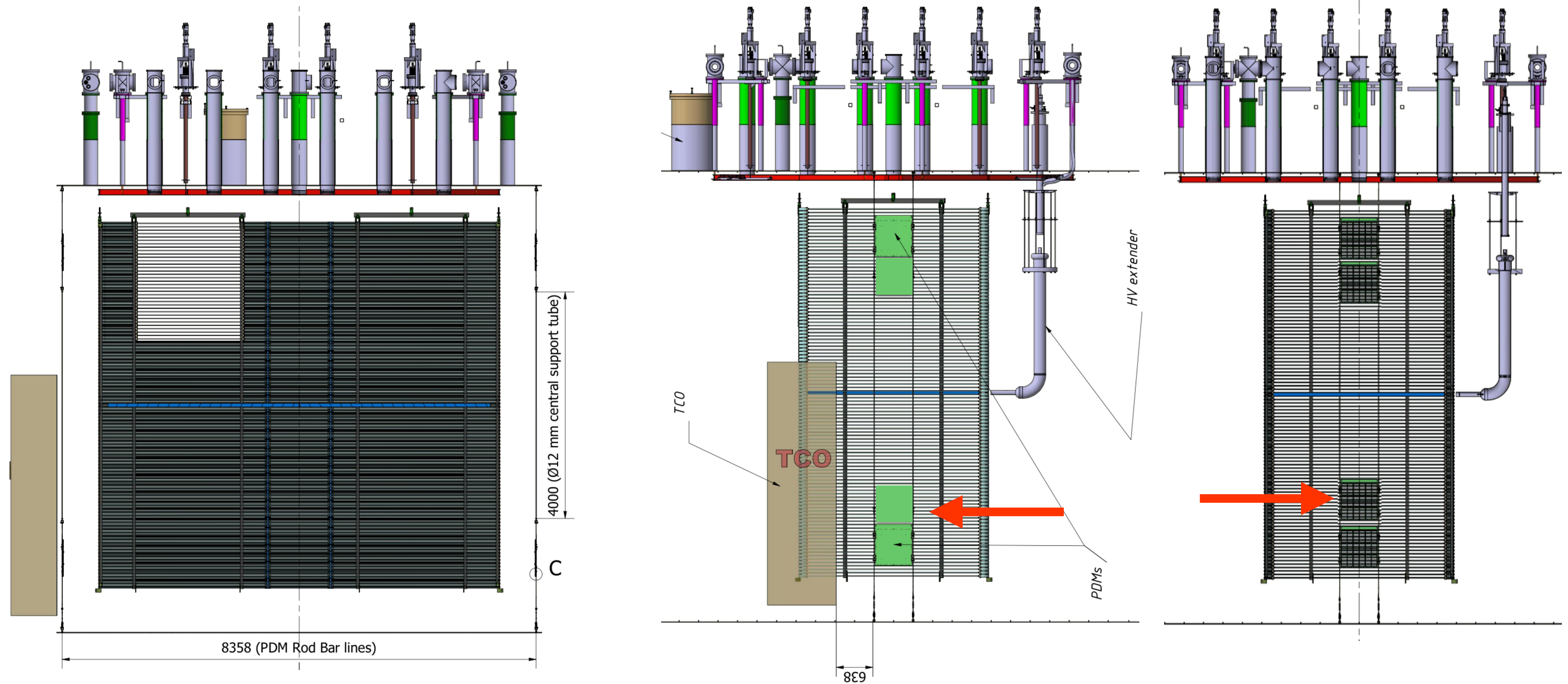
# XA installation with cathode in place

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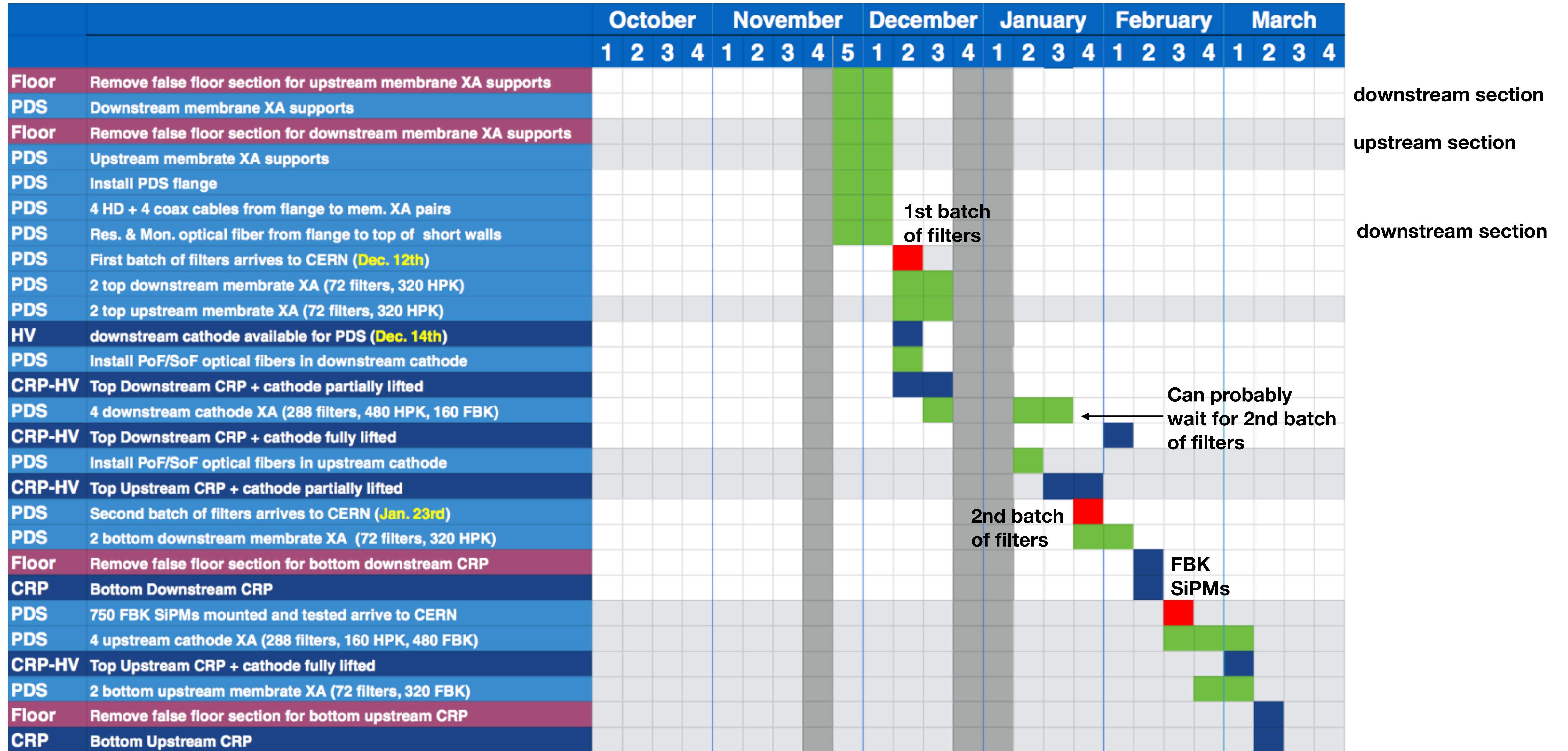
- Well received at integration meeting
- Two options proposed by Philippe
  1. the CRP cabling not done, then lower down the cathode and at least work on the cryostat ground and access to the 2 sides
  2. work on a scissor lift at 3m high. Think at mesh supports different at the top as we may not be able to clipse them as we will see nothing.
- First one was also raised by Fabian at the integration meeting with no major complains
- CRPs will be available in December
- First cathode might be available on December 14th. Cathode people would prefer to delay installation to January

# Bottom membrane XA after FC deployment

- No complaints at Module-0 integration meeting
- Enrique working on it



# New version



Can probably wait for 2nd batch of filters

1st batch of filters

2nd batch of filters

FBK SiPMs

# February installation: 8 modules

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- Depending on the overall Module-0 schedule situation for February 20th:
- **Option 1.** If second cathode not yet installed (**unlikely**)
  - Install modules in cathode by March 3rd
- **Option 2.** If second cathode installed previously but not bottom CRP
  - Install modules with cathode in place by March 3rd
  - **Preferred:** even distribution of FBK between cathode and membrane
- **Option 3.** If upstream bottom CRP already installed
  - Install 4 bottom membrane modules (cathode modules installed earlier)
  - **backup solution (only one cathode module with FBK)**



# Plans for next version

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- Next week we will have more info about overall Module-0 schedule
- Need to incorporate:
  - Response and monitoring fibers. Need exact locations (Zelimir's talk)
  - Availability of XA module frames
  - Split each group of modules to account for the different electronics options and availability of components in each installation period
  - Interface with cold boxes

backup

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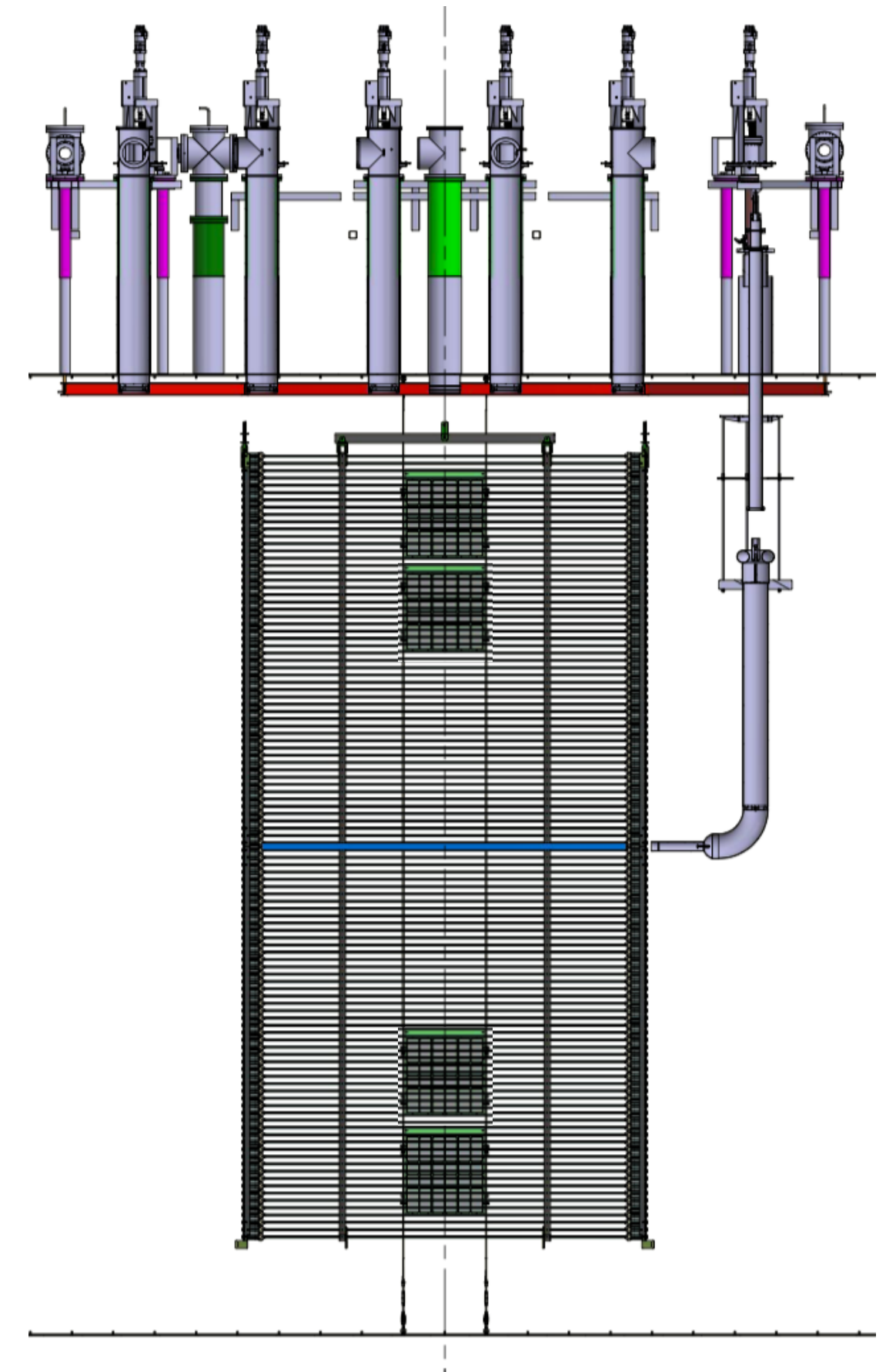
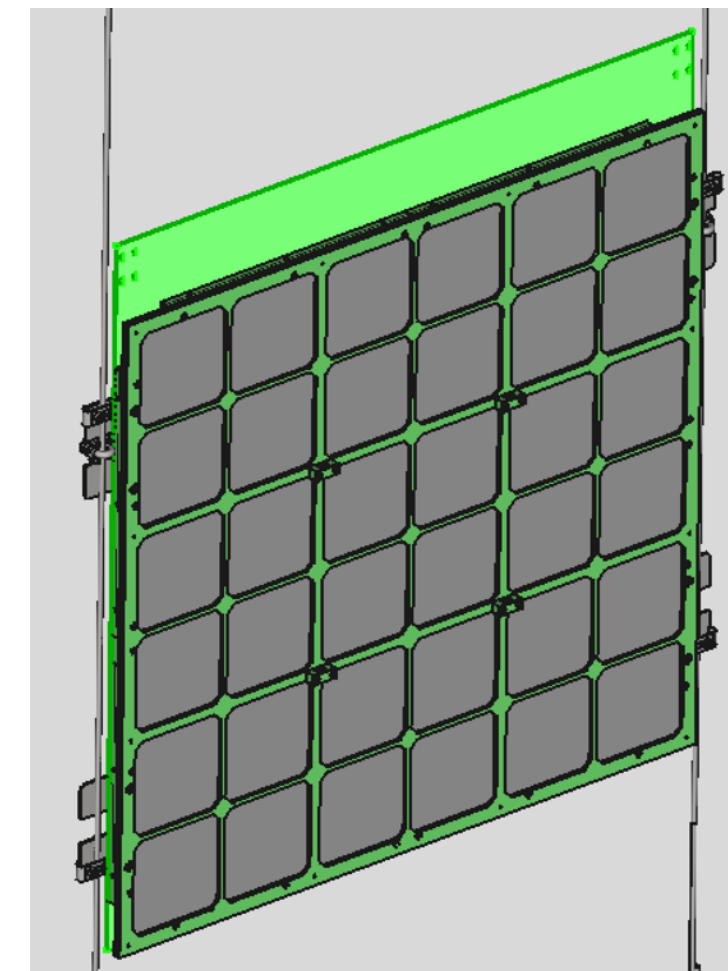
# Components driving the schedule

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- Current schedule driven by dichroic filters and SiPM availability
  - Dichroic filters available at CERN in two dates:
    - December 12th: goal is 8 modules, 6 modules almost granted
    - January 23th: all remaining modules
  - 750 FBK SiPMs mounted and tested by mid February: 5 modules
    - Ideally a fraction of those to be installed in second cathode, before bottom CRP installation
    - The rest for bottom membrane modules (after proving that can be installed with bottom CRPs or even FC in place)

# November Installation

- Supports for membrane modules
- 4 HD style cables for membrane modules. One for two modules
- 4 Coax cables (and FT) for signal out
- Optical fibers (will be discussed tomorrow)



# December Installation: 2 modules

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- 2 downstream top membrane modules:
  - Must happen before the downstream CRP-cathode installation
  - All material at CERN by December 12th (not before)
  - Assembly of 2 modules can take 3 days
  - Installation on membrane 1 or 2 days
  - Installation completed by December 17th
  - Is there time for downstream CRP-cathode installation in December ?

# January Installation: 6 modules

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- 4 downstream cathode modules
  - Assemble four modules: one week (if possible before Christmas)
  - Install them in cathode: 2 days
  - Class 4 laser test: 2 days
  - Installation completed by January 23rd
- 2 upstream top membrane modules:
  - Second batch of filters at CERN by January 23rd
  - 4 days total
  - Installation completed by January 27th
  - Must be done before the upstream CRP-cathode installation

# February Installation: 8 modules

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- 750 FBK SiPMs (5 modules) available by February 20th
- Preferred option is to distribute them evenly between cathode (PoF) and membrane (CuP)
- That would require installation with second cathode in place. If that is proven to be possible we will have:
  - HPK SiPMs: 3 modules, 1 for cathode and 2 for membrane
    - One week assembly + tests, ready by end January
  - FBK SiPMs: 5 modules, 3 for cathode and 2 for membrane
    - Assembled and tested in 10 days
    - Ready to be installed in membrane and cathode by March 1st