RECEPTION AND MATERIAL TRACKING.

A proper tracking of deliveries and materials is needed. A proper knowledge of what information to track is needed.

1. An excellent way to keep track of the material would be to create a QR code for each spare and consign this in a spreadsheet. For example, at CERN, we lose track of the position of some filters. We can easily have the range of the numbers but not exactly the number.
2. At all stages, the first action should be to check and write the pieces of each module. All groups should have access to this database, but we should grant writing permission only for the current action, process, etc.
3. Spare units for things that are hard to find locally should be added to avoid delay from mistakes while assembling.

MECHANICAL ASSEMBLY.

1. SiPM pins rooting. Complicated to align the pins with holes on the stripes (whatever the thin bars for readout is called) and dangerous, easy to bend or break pins.
2. Several pieces (FR4, G10) were not properly drilled and had to be drilled again so screws could pass by.
3. Many supercells were dirty.
4. Two experienced people could build a module in ~2-2.5 hours.

FILTERING.

1. Filter support structure should be modified. Filters on both sides of the module can not share the same support structure (one side falls when installing the other).
2. Use of washers to decrease pressure on filters does not feel as an accurate approach. How many washers? Washers can fall inside the modules and hard to remove. Could it be possible to make the FR4 pieces so washers are not needed?
3. Some of the modules sent by CSU had short screws holding the filters, some of them were loose and got broken.
4. Some SC had the frame slightly bent to the outside, making the filters suffer more pressure than normal.
5. Two experienced people could filter a module in less than an hour. Double-sided took 1.5-2 hours.

APA INSERTION.

1. Just after the assembly procedure, the modules were sturdy and compact. But, after moving them from one place to another, for example, to move them from assembly room to cryostat or to arrange them in the correct order to install, We loosened the flat head screws just by moving the modules. This occasioned many issues in the installation. We mitigated this by tightening the screws just before inserting the module in the APA frame. Using round-head screws for the horizontal holes may help too.
2. About the Q&A, we had issues with the horizontal rails for the PD modules, the alignment between the frame, and the piece in the center of the APA (Close to the

support of the Sasebo, sorry I don't know the spelling); and the conduit bent. Apart from the board's connection, the main issue was that we stuck the modules inside the APA frame because the flat screws were touching these parts. The tolerances were added, causing problems in the installation. With the dummy module, we used a couple of screws between each cell, using the holes for the pieces in the corners. This increased the stiffness of the module; maybe this can be made with the actual modules.

3. Silver plated screws meant to attach the module to the APA frame were quite complicated to tighten once the module was inserted. Also, if a module needed to be removed, these screws are very likely to fall inside the APA frame.
4. A dedicated tool to test continuity between AECB board and APA top is needed.
5. Cold cable installation in bottom APA's was complicated. Jumpers were needed.
6. A more reliable tool than a skinned cable should be used to check continuity. Even better if automatic.

PENETRATION.

1. The plastic support for the cold cables on the flange is fragile and very susceptible to breaking. Pieces can fall inside the penetration and get stuck in the clamping device. A stainless steel support could be better. Should use longer silver plated screws for attaching the metal rods of support system and flange.
2. The heavy flange must be lifted for at least four people. Maybe an instrument similar to the ones on top of the VD cryostat may help. Some pulley to lift everything while you secure the flange to the penetration.
3. Click Hirose connectors are wiggling. Threaded connectors are better in terms of mechanical contact. Stainless steel support also could help to mitigate this problem.
4. **The protocol to lift the cables is dangerous. When we install the cable trace in one of the baskets of the scissor lifts, the man on it is "trapped." The cables prevent the use of the scissor lift from moving during the maneuver. In any emergency, we don't have a secure way to take them down in a safe manner. A way to mitigate this is to design provisional support for the cable trace in front of the APA. Scissor lifts must be accessible.**

DAHPNE.

1. We must make correct isolation between the chassis and the board to prevent short circuits.
2. We should develop a mechanism for isolation between the connector's housing and the chassis.
3. For the new version of the layout, it would be necessary to constrain the paths of the AFEs.
4. BOM in the schematic should match the final board. (I'm not sure there's a protocol for this, I know Altium has a way to track changes in the BOM)
5. Short cables on the warm side are desirable, but we couldn't demonstrate a significant impact in the s/n.

6. We can implement a more sophisticated trigger, but the full streaming feature is excellent for getting general information about the number of cosmics, wavelength, calibration, module characterization, and DCR.
7. With this information, we can be more confident about the trigger algorithms.
8. An upgrade to a faster streaming interface is desirable to provide only one protocol among the FEB to the DAQ. This can reduce the operative cost of the experiment. But this increases the budget for the production of the boards by at least 30%. (Pinout and device size consideration)
9. Using an algorithm with 320 windows and recovery of the pedestal, we can open a new window only for the pulses truncated on the right. This can increase the bandwidth a lot.
10. A remapping should be done in firmware to give the user a friendly mapping of the channels among all the interfaces (uC, FPGA, PD Modules, Cables...) It's hazardous to work with the confusing pinout because it may lead to errors in biasing the modules or getting data from the wrong device.
11. If we notice CRC errors between DAPHNE and FELIX, the first action should be to test the polarization and mechanical disposition of the optical fibers. A short radius produces power losses and CRC errors.
12. The grounding scheme will be our next big challenge.
13. I remember Terry mentioned the addition of some beads on the flange to mitigate noise. I don't know if the flange has those at the moment.

OTHERS.

1. Warm cables hoods should be metallic and connected to the shield.