

Magnet Offsets in the Hall Model

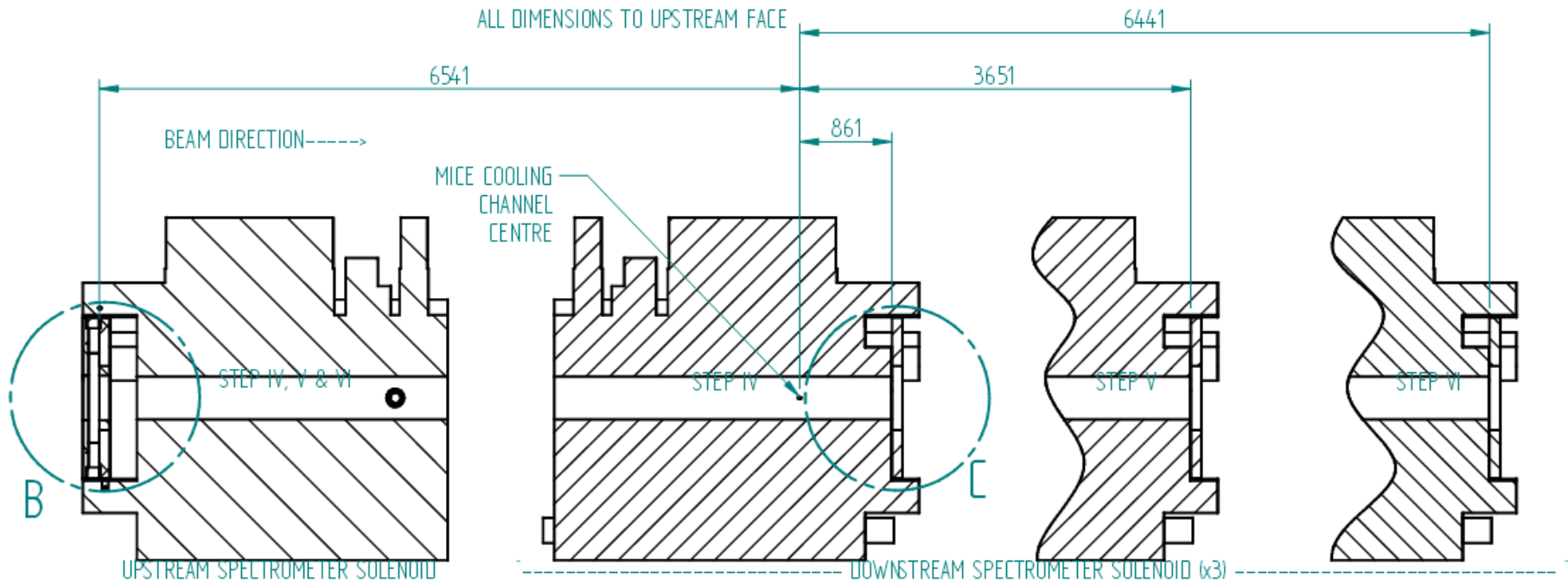
Discrepancy between location of
TRD and 'As-Built' magnets

All of the magnet files used in the Hall model are based on the TRD design **BEFORE** the RFCC extensions were incorporated. The TRD values, both the coil currents and dimensions, have been used in the Hall model because there is some uncertainty in the required coil currents in the 'as-built' magnets to get matching optics in the channel. The TRD values are well defined.

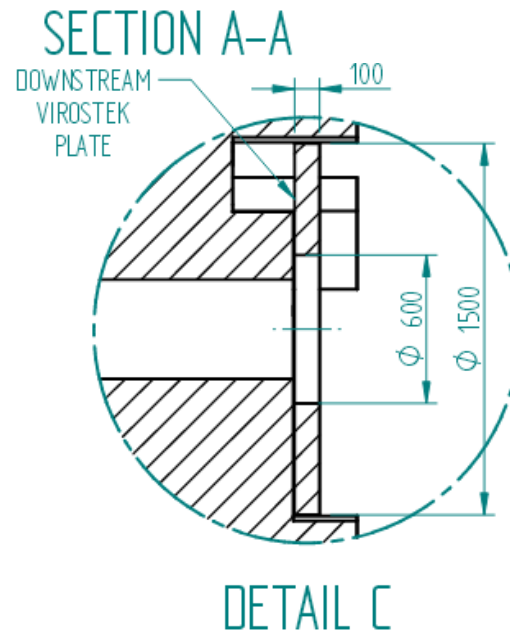
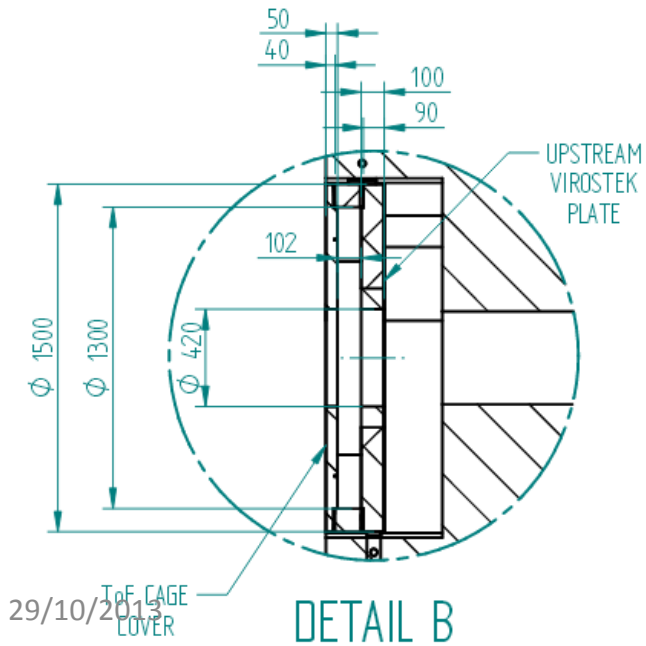
This has meant that the cooling channel as implemented in the Hall model is slightly shorter than it should be due to the lack of these RFCC extensions. I also understand that there are other small discrepancies between the design and as-built dimensions for the manufactured coils but these are not considered significant in terms of magnet location.

The location of the Virostek Plates in TD-1189-1167 appears (rightly) to have assumed the existence of the RFCC extensions. This drawing has been used to provide the location of the Virostek Plates in the Hall model.

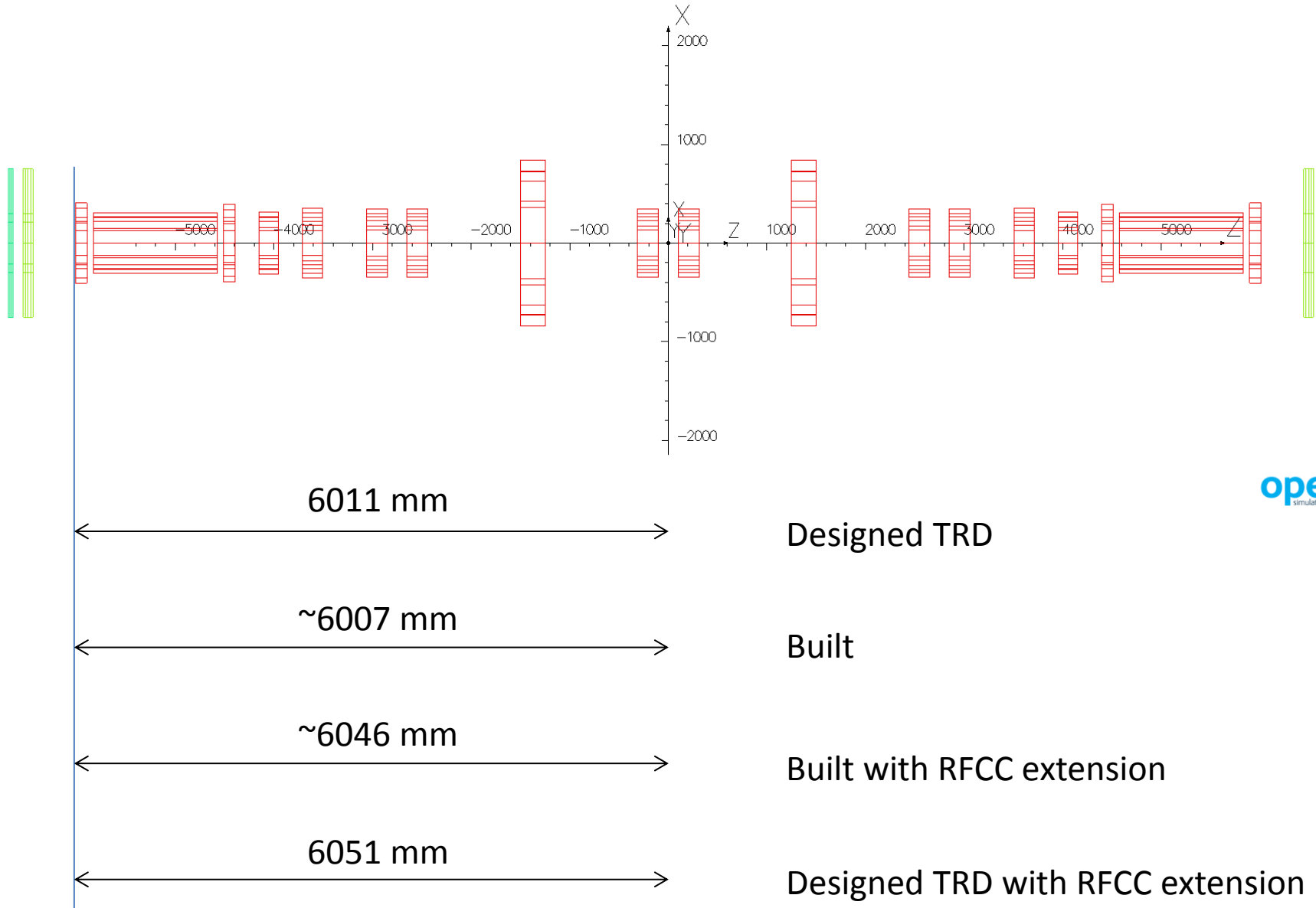
This mixture of using VP locations based upon a cooling channel with RFCC extensions and using magnets files which assumes no RFCC extensions has caused a couple of minor offsets in the location of the magnets with respect to the VP. **I don't believe that the effect of this offset will be serious** but this note has been produced to document what the offsets are and the corrective measures to be taken in the next round of models.



TD-1189-1167



Note
Virostek
Plates are
100mm
thick.



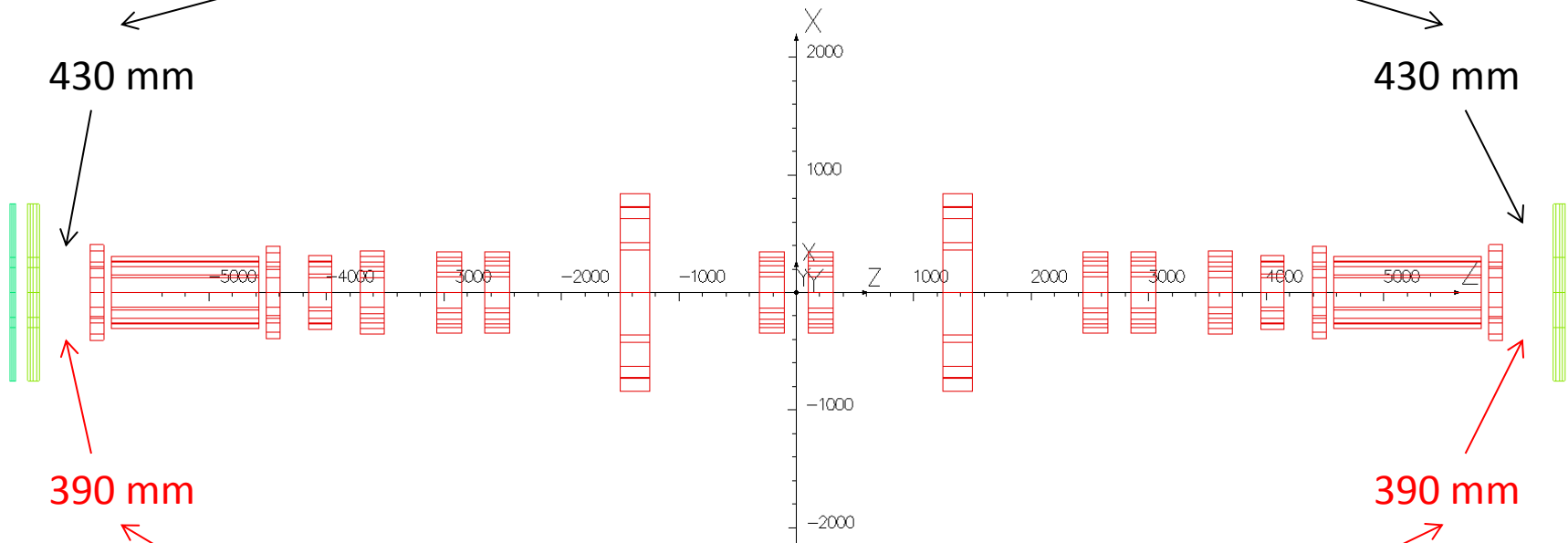
See Mice Note 153, Mice Note 332 and the TRD section 4.1

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Coil Centre = 0 mm
Centre of VP = 0 mm

Step VI – Actual gap in the Hall Model

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Step VI – What the gap should be with the RFCC Extensions included in the channel

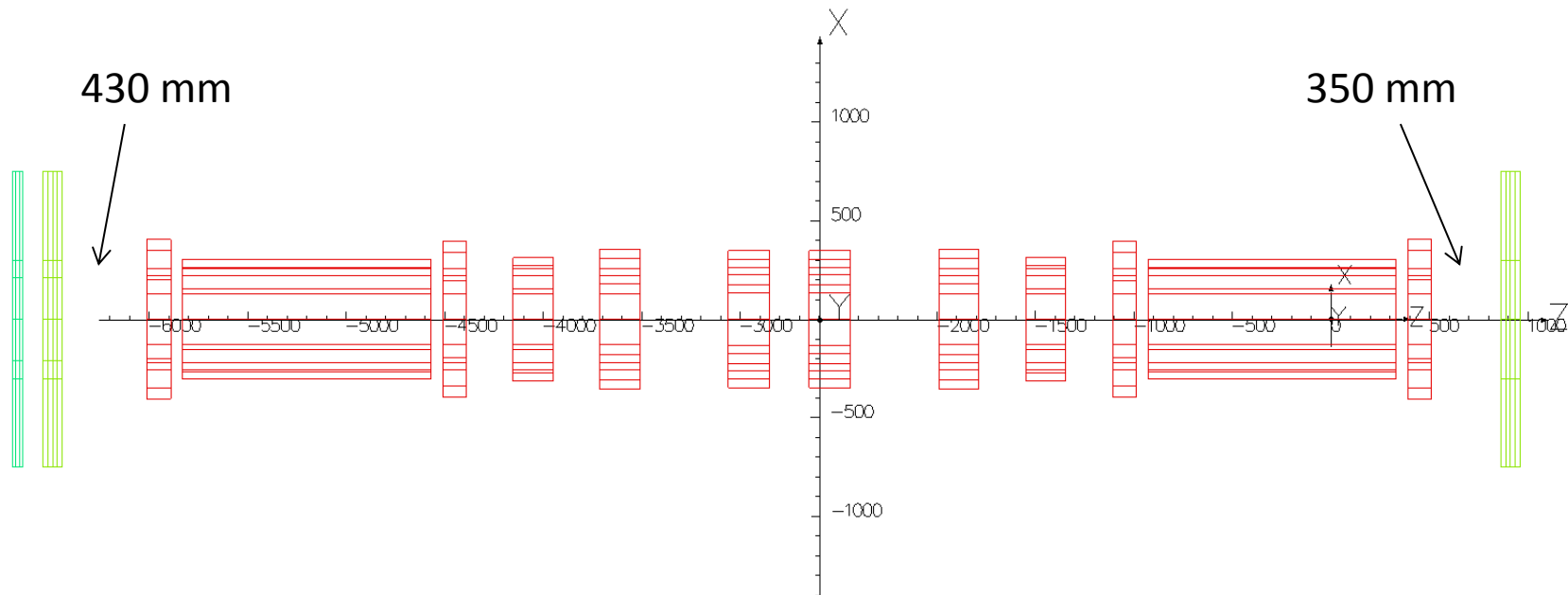
opera
simulation software

So the Step VI Hall models are symmetric between the Virostek plates. - GOOD

Step IV – Actual Hall Model

Coil Centre = -2750 mm
Centre of VP = -2790 mm

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The position of the VP's assumes a gap to the coils of 390mm but the coils as implemented in the model (TRD) are shifted 40mm DS wrt this. I speculate that this has occurred because the US SS was pinned to its fixed location pre RFCC extensions.

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simulation software

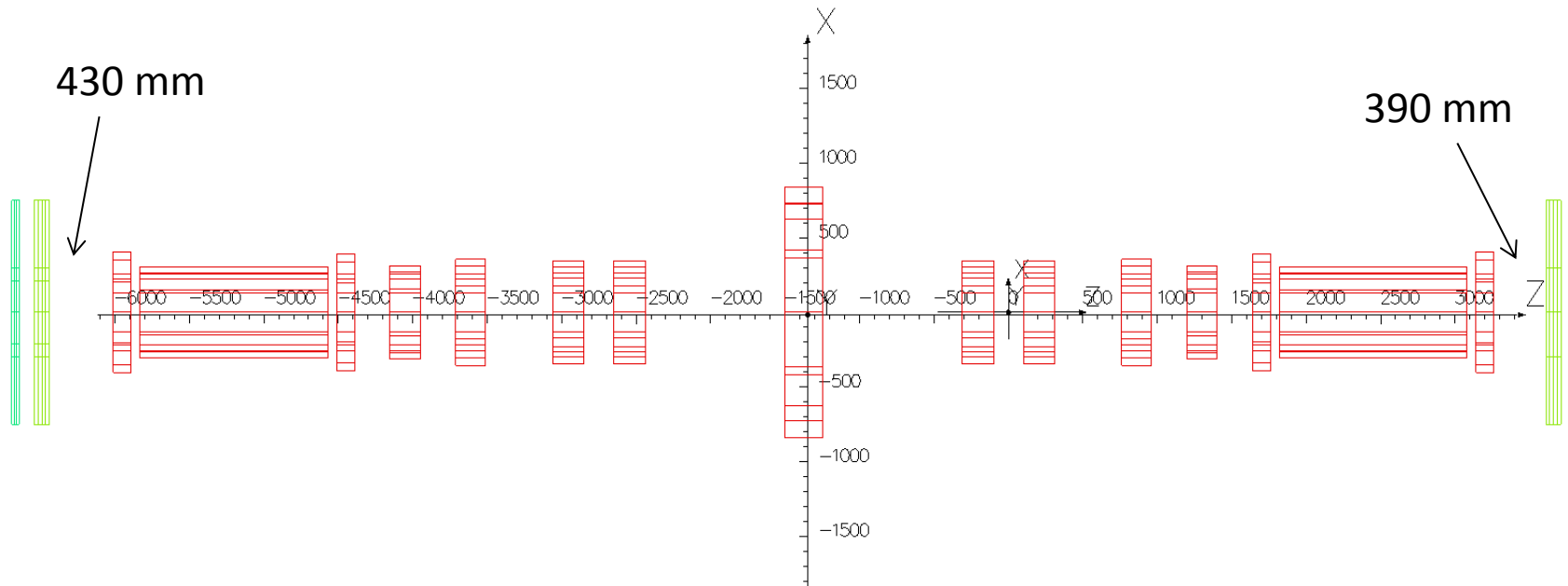
For symmetry (which is what you would obtain with as-built magnets) all the step IV TRD coils need moving East by 40mm giving a 390mm gap at each end of the channel. This gives the correct nominal gap distance as there are no RFCC extensions in the step IV cooling channel.

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Step V – Actual Hall Model

Coil Centre = -1375 mm
Centre of VP = -1395 mm

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The position of the VP assumes a gap of 390mm but the coils are 40mm short of this at the US end because the TRD coils don't include the RFCC extensions. (This is 2x20mm per Coupling coil)

For symmetry all the TRD coils need moving East by 20mm. This will give a gap of 410mm at each end of the channel.

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I don't believe that a 40 mm discrepancy in the position of the magnets is going to change our conclusions for the Step IV models or even significantly change any results.... (I say step IV as I've only run one step V model so far), however we can compare the models before and after to convince ourselves that this is the case - at least for solenoid mode...

On a related note:

In trying to get to the bottom of why there was a difference in the gap distance between opposite ends of the spectrometer solenoids and Virostek plates, Mike uncovered a mistake in the step IV flip file. This means that **all the step IV flip mode results published so far are currently invalid** and these models need re-running.

The mistake was that the currents in the AFC were reversed, resulting in a triple flip along the cooling channel.