

Follow-up alignment

cf meeting SY-RF, SY-BI, BE-ABP, BE-GM

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<https://indico.cern.ch/event/1373059/>

Summary (BE-GM)

Pick-ups mean : 4 button pick-ups + 1 short strip line wrapped in a back-out equipment that will remain in place, per beam, e.g. x2 on each side of CC modules.

For the pick-ups, 3 alignment steps have to be considered:

- Step 1: The fiducialisation of each pick-up: determination of the electrical axis w.r.t. 4 mechanical references (performed by SY/BI); the mechanical fiducialisation (mechanical axis w.r.t. mechanical references) is performed by the metrology lab (EN-MME). Concerning the accuracy: the determination of the electrical axis is performed at better than 10 μm , while its reference w.r.t. mechanical interfaces is less straightforward (within 100 μm ?).
- Step 2: The initial alignment of each pick-up on the top plate of the UAP platform: performed in the CMM environment, no adjustment systems or shims added, just re-machining of the parts if needed, and determination of the pick-ups in the UAP platform referential frame.
- Step 3: The alignment of the platform in the tunnel.
- As a non-FRAS equipped component, the adjustment of the UAP will take maximum once per year, during the YETS.
- The beam offset between CC and pick-ups could be cross-checked using the beam during the commissioning phase.

The alignment roll presented in Wolfgang's slides p19 looks very challenging:

- A bad Roll has a strong impact on the quality of measurement and leads in a loss of sensitivity, but we should rediscuss what is reasonable and achievable as a value
- The use of a permanent inclinometer (during steps 2 and 3) could help following the roll, with a relative accuracy of 40 μrad .
- We should also consider the impact of ground motion (and other constraints) for pitch and yaw (some 1 mrad values shown by Riccardo on other BPMs)

Actions:

- Roll tolerances: define what is needed and achievable: Riccardo, Wolfgang, Michal
- Organize a visit at SY/BI lab to understand the fiducialisation and initial alignment process: Michal
- What is the accuracy of the determination of the electro-magnetic axis of the CC? Rama

Crab cavities (summary by BE-GM)

For the CC:

- no longitudinal adjustment foreseen after the initial alignment during LS3 (no longitudinal position monitoring is foreseen on the CC, only on the main quadrupoles).
- The alignment tolerances of the CC (on Wolfgang's slides p11) are all at 3 sigma. A new value has been agreed for the roll alignment: < 1.2 mrad (3 sigma), according to what is achievable. The new value will be updated in Riccardo's document on tolerances and in the FRAS engineering specification under finalization.
- These tolerances refer to the mechanical axis, not the electro-magnetic axis (what is the accuracy of such a determination)?