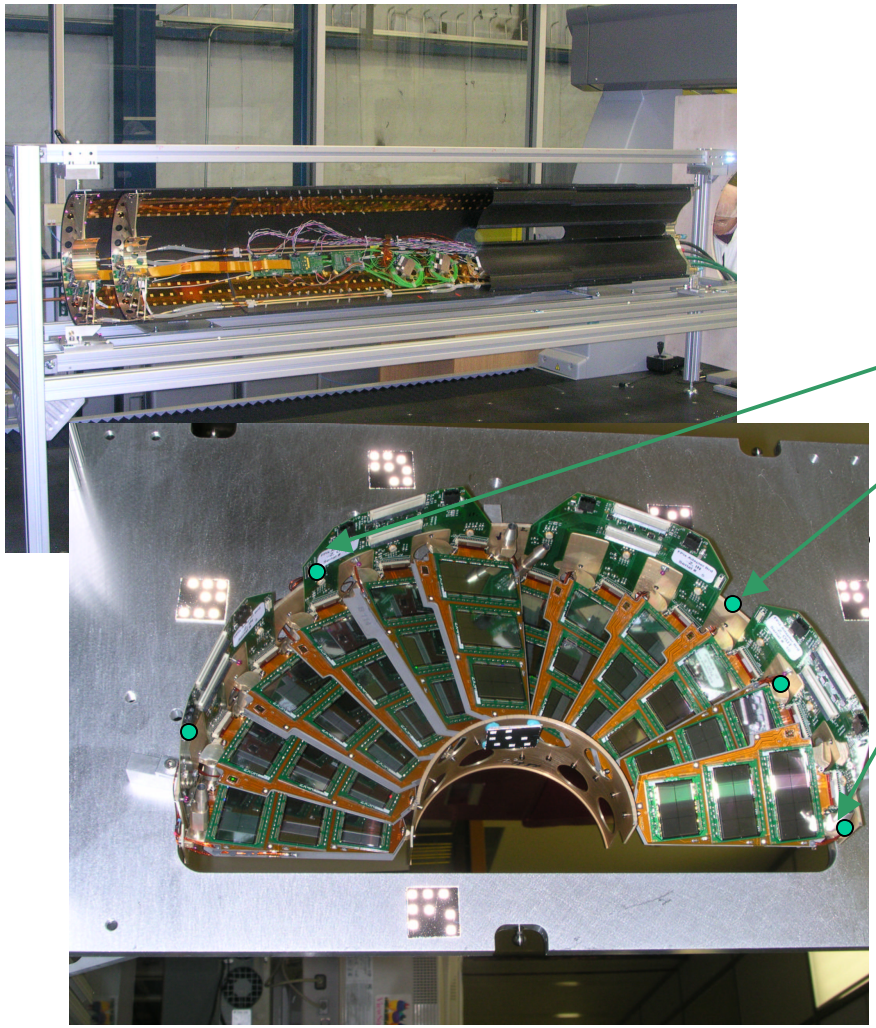
FORWARD PIXEL SURVEY ISSUES AT CERN

STEP I: Half Cylinder Survey at CERN

- Survey half-disks reative to half-cylinder after re-installation will be done by photogrammetry.
- Photogrammetry issues: 1mm and 3 mm targets are used at FERMILAB, however at CERN 1 mm targets can not be surveyed: need to change the procedure.
- Suggestion: add 3-mm targets on the half disks and survey them together with 1-mm targets – eliminate need to see 1 mm targets at CERN.

STEP I: Half Cylinder Survey at CERN



- Add 3 mm targets (~10/half-disk) on the inner surface of the half-disk and survey them with photogrammery
- The same time explore CERN capabilities
- Learn how to use the transporting and installation fixture to make survey: what needed to be added (J. Howell)

STEP II: Support rail survey

- **Need to find out exactly how the support rails will be surveyed: is it fully on the CERN crew?**
- **Need to understand and analyze these survey data(format, data base and so on)**
- **Connect this survey with our results and global CMS coordinate system**

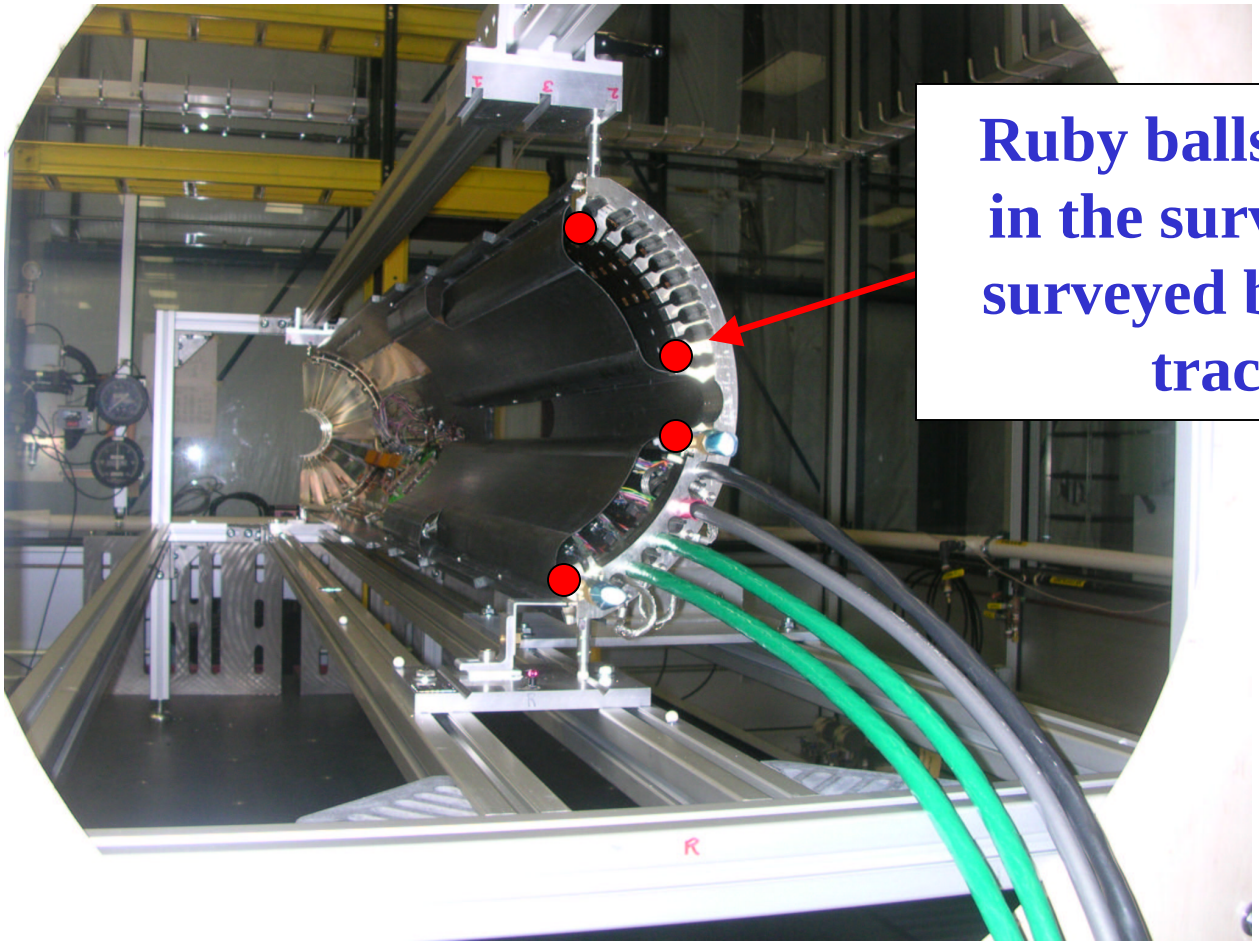
STEP III: Final Survey during Installation

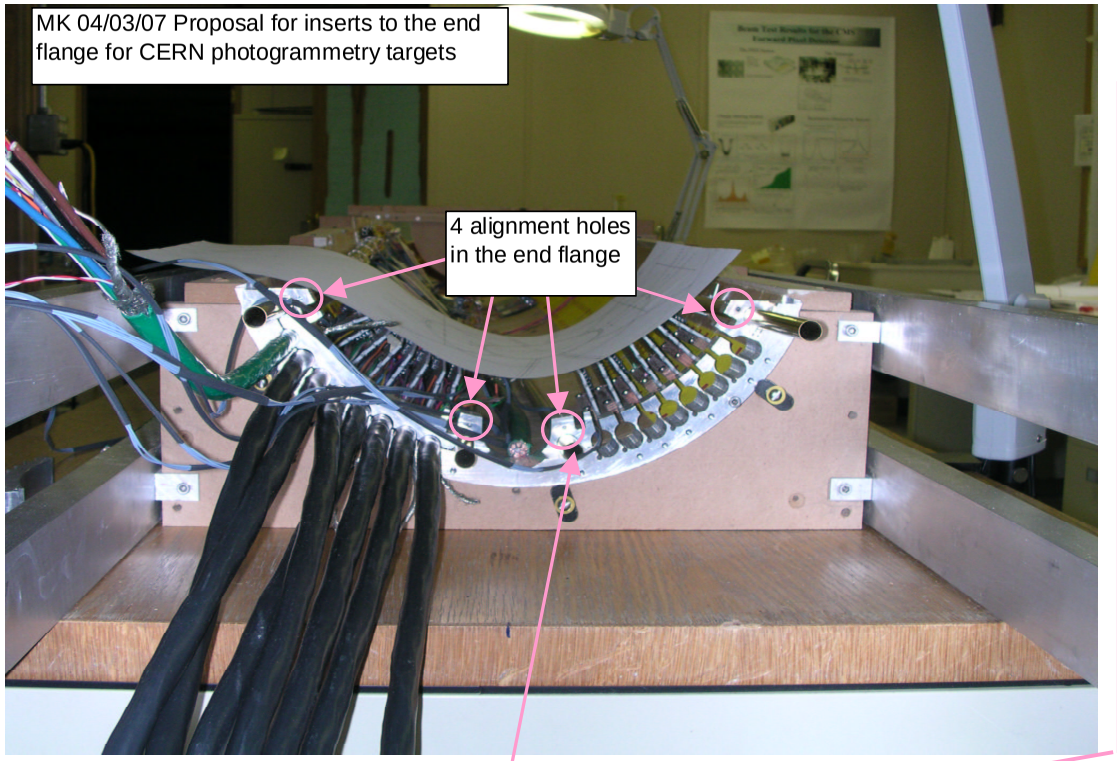
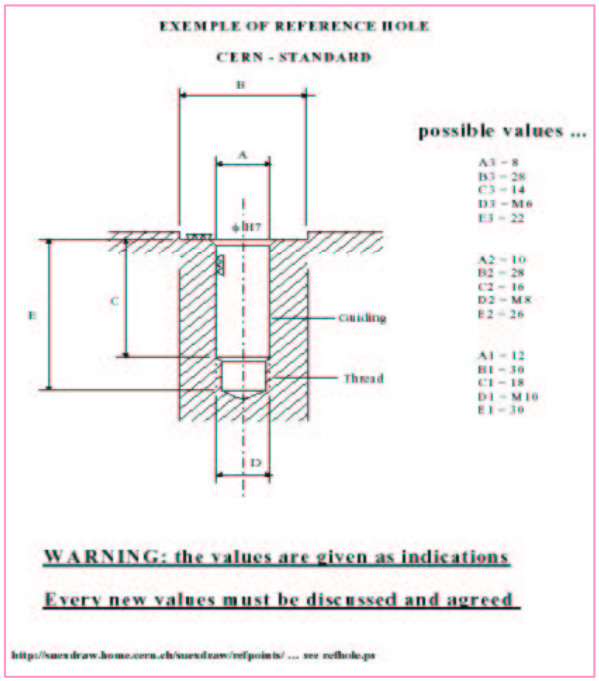
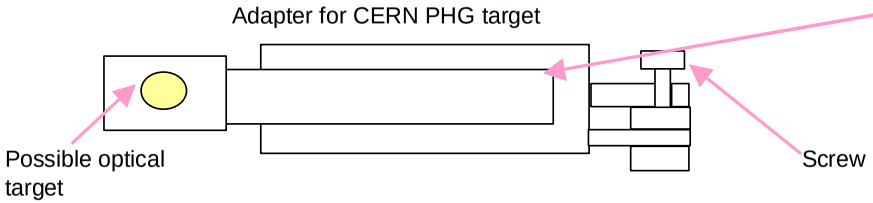
- **Use Engineering Run to establish full and consistent procedure**
- **Proposal: as the half-cylinder and rails are surveyed we only need to verify final position of the detector using what available (quick and simple! – no time to spare)**
- **Namely, we have four survey holes in the end flange (NEXT SLIDE). There are two options suggested:**

  A. insert existing 2.5 mm ruby balls and measure their positions using LASER TRACKER;

  B. make adapters to install CERN standard photogrammetry targets into these holes
- **This targets are to be surveyed together with half cylinder at CERN**
- **Need to verify visibility and space available after cabling!**

STEP III: Final Survey during Installation: Option A



Ruby balls inserted in the survey holes: surveyed by a laser tracker

STEP III: Final Survey during Installation: Option B