Magnet Measurement Device for MICE

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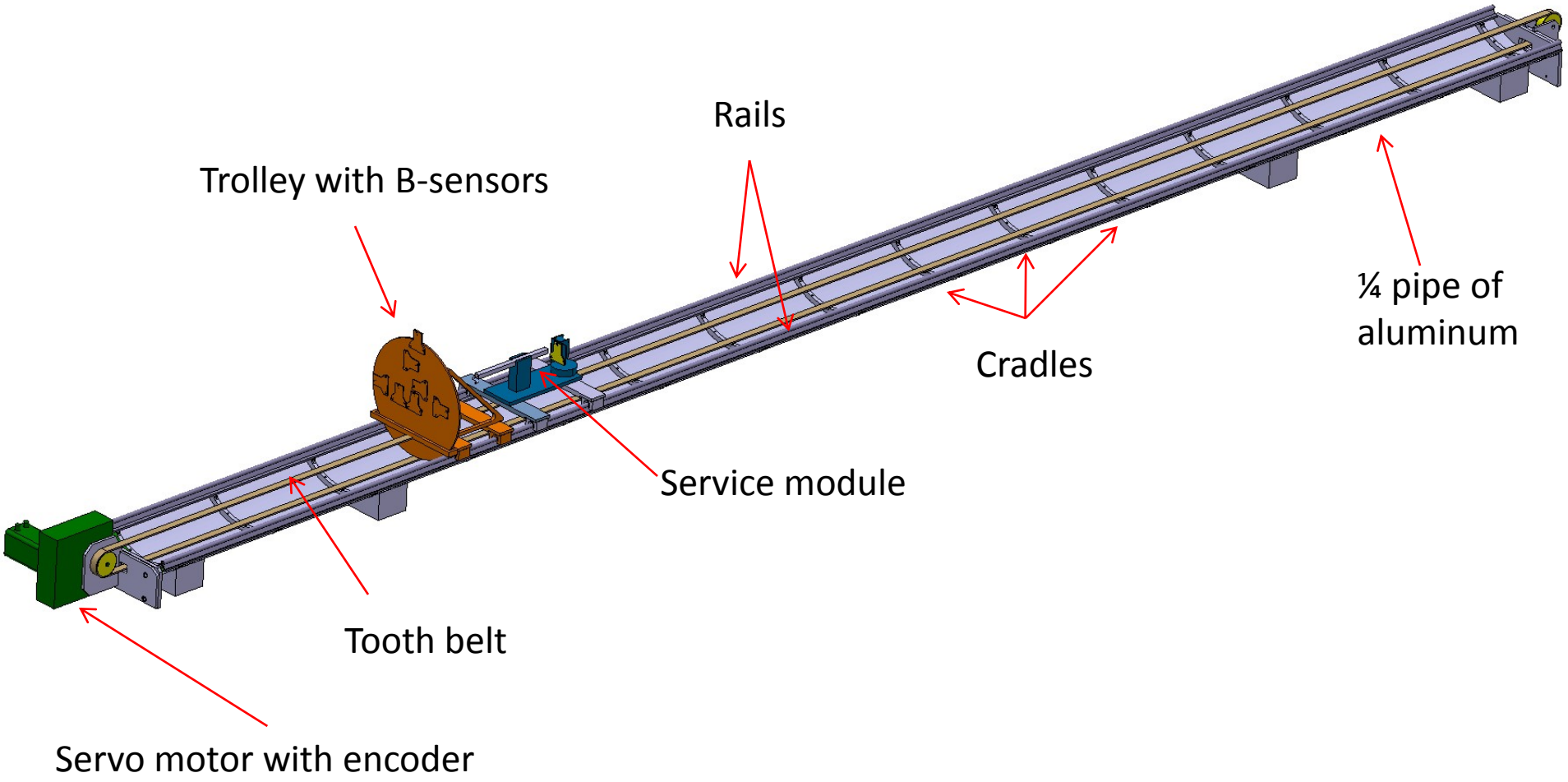
CERN

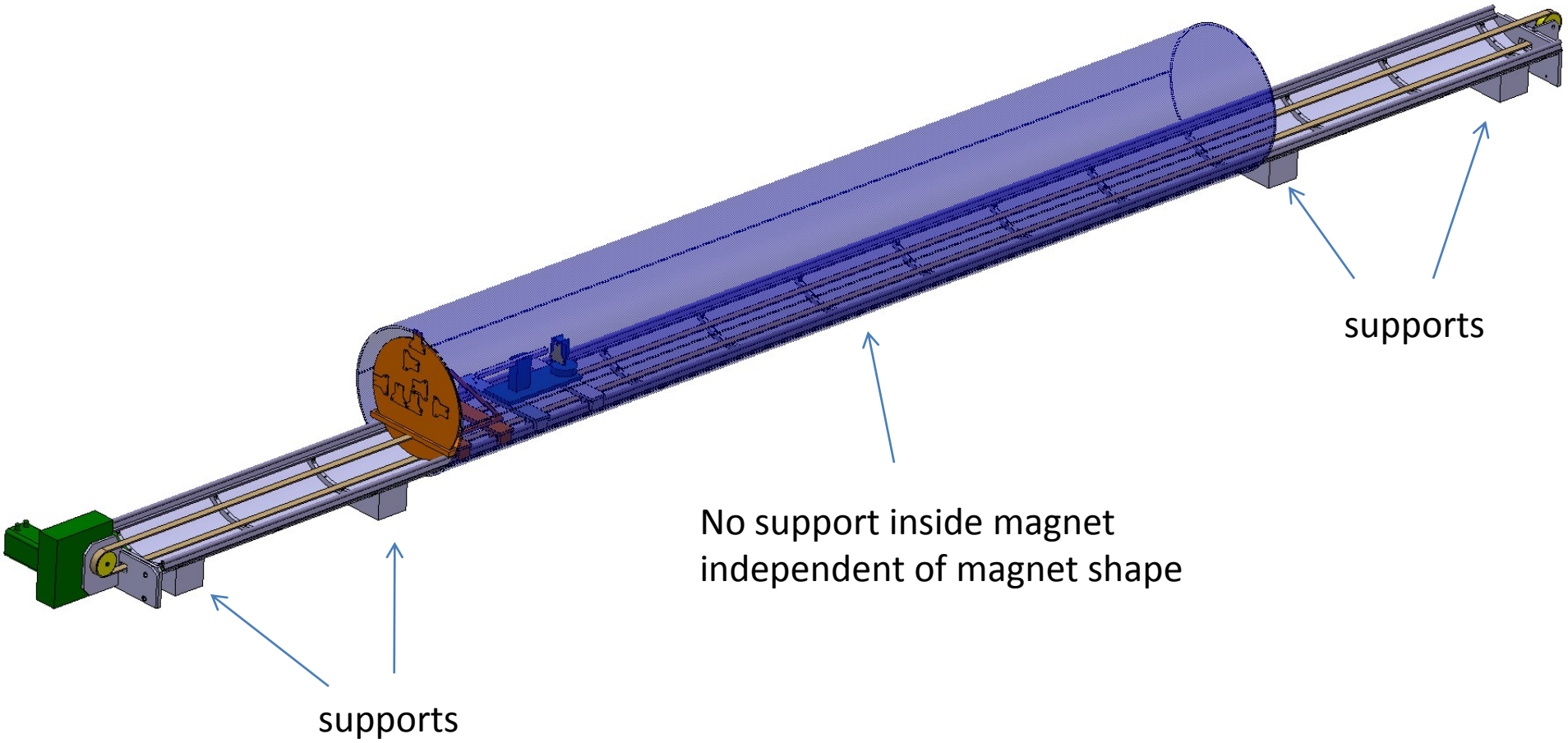
MICE Collaboration Meeting No. 29
RAL

technical drawings by O.Jamet

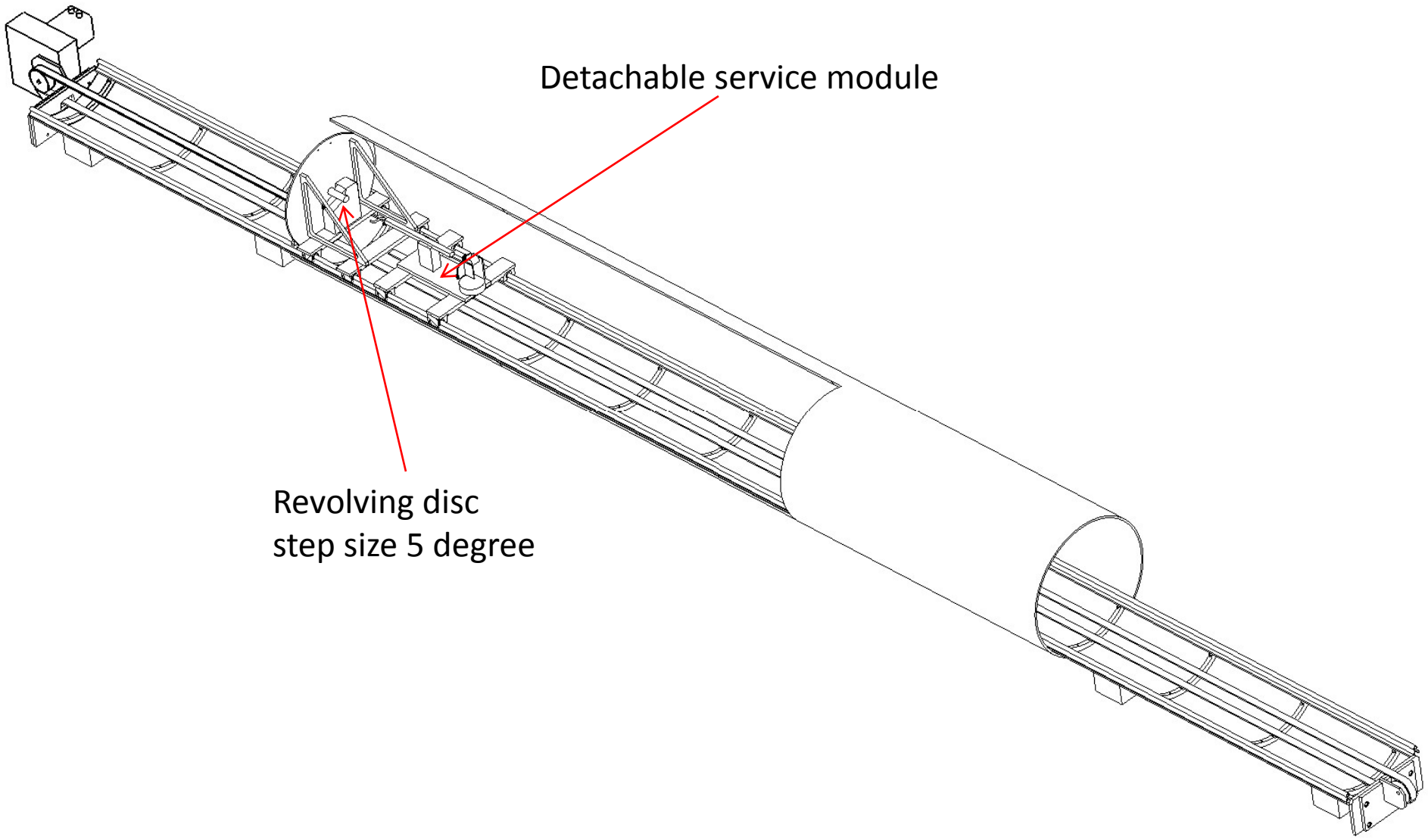
Layout


Rails
Trolley with B-sensors
¼ pipe of aluminum
Cradles
Service module
Tooth belt
Servo motor with encoder

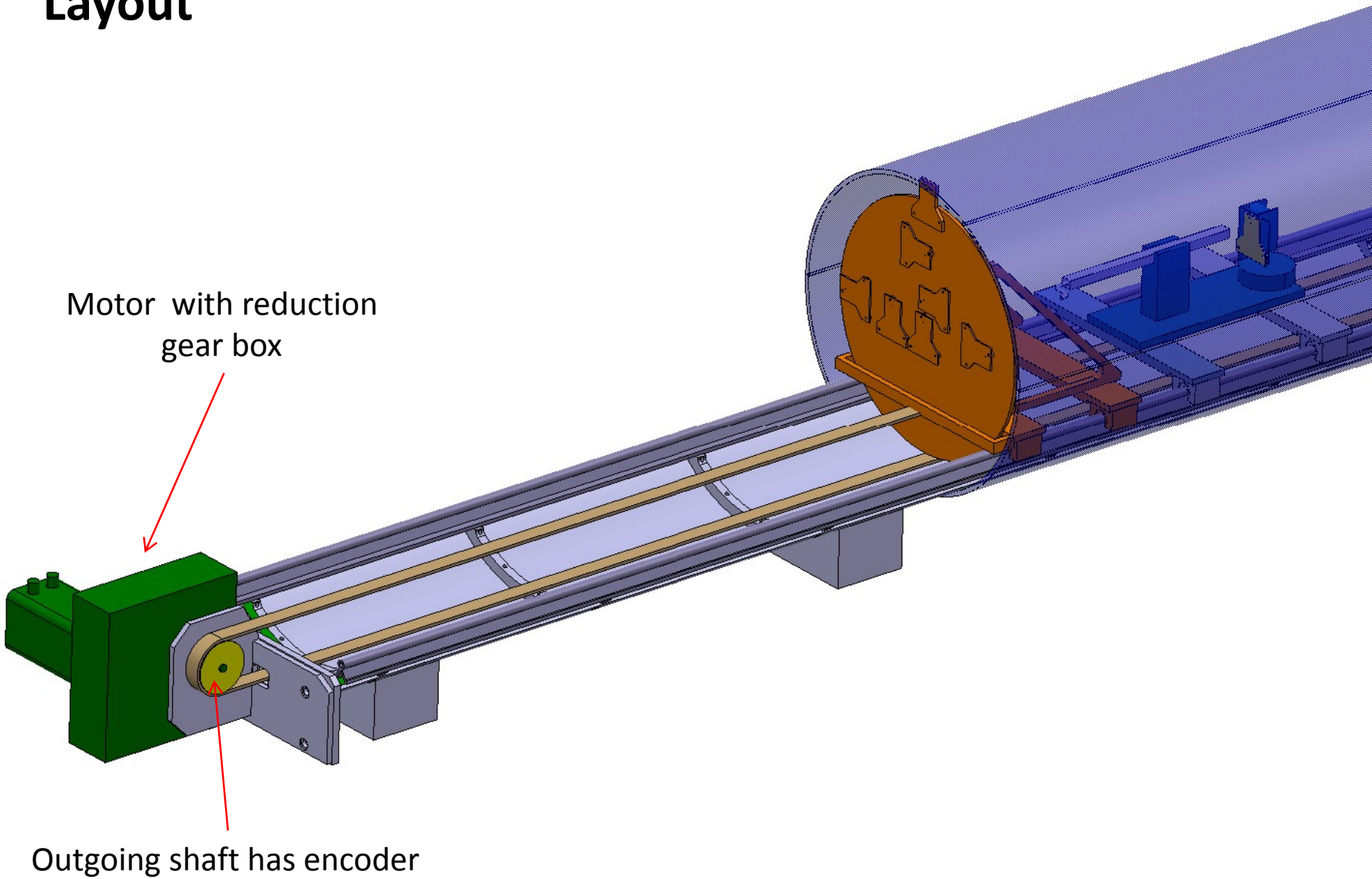
Layout


supports
No support inside magnet
independent of magnet shape
supports

Layout


Detachable service module
Revolving disc
step size 5 degree

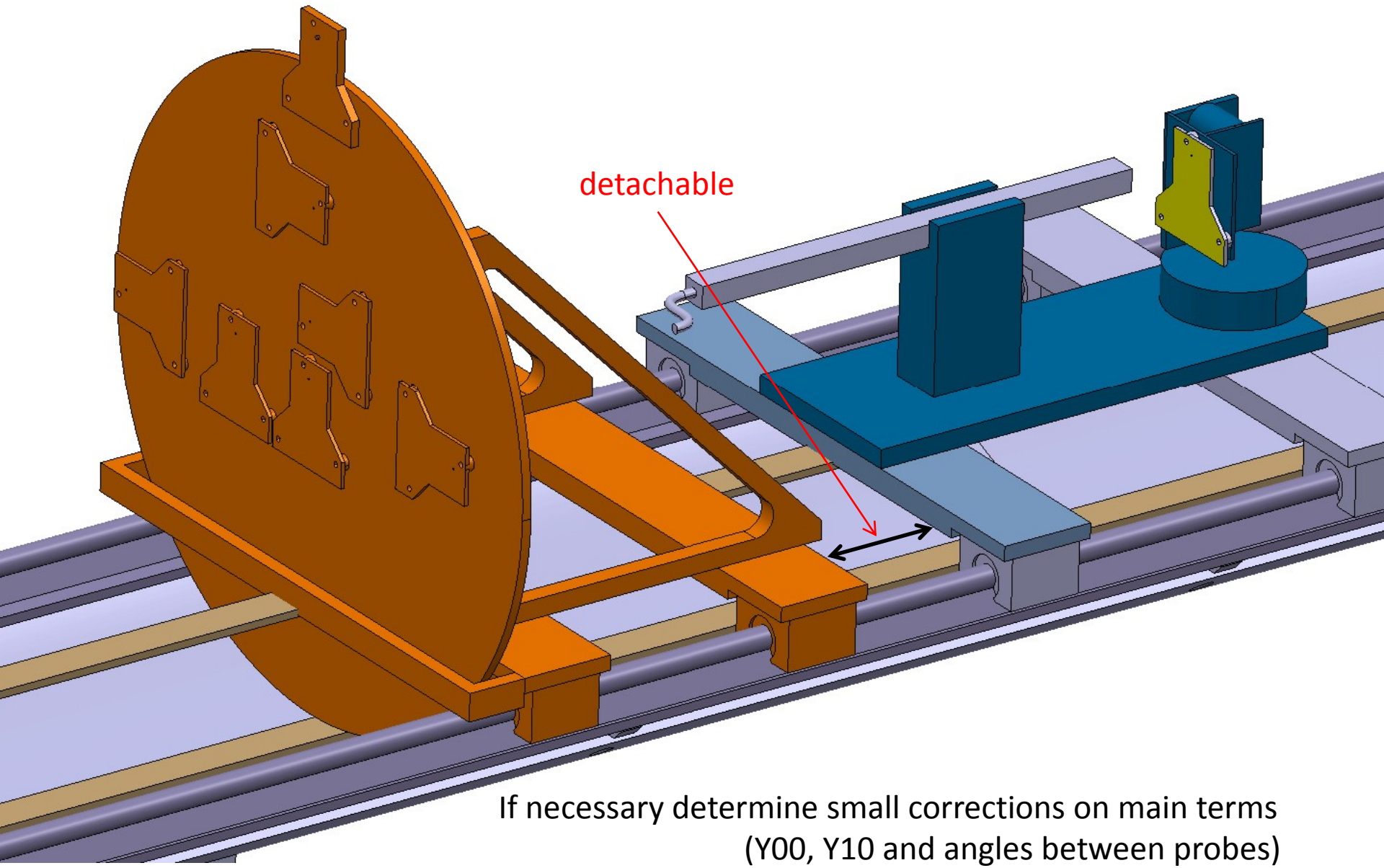
Layout



¼ pipe support for rails and cradles

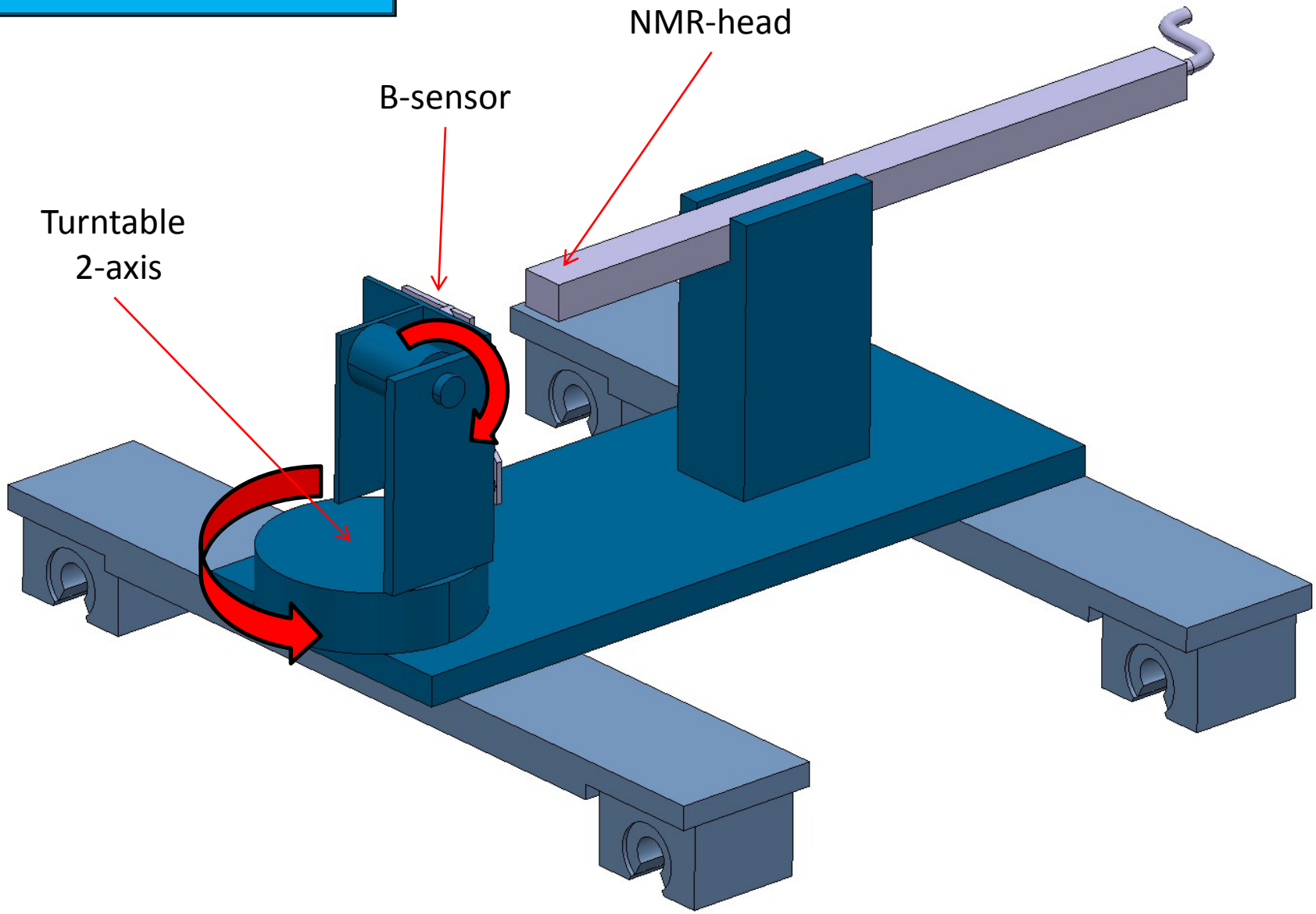
(aluminum pipe of 400 mm Ø, L = 6m , thickness 10 mm is most difficult to find part of bench)

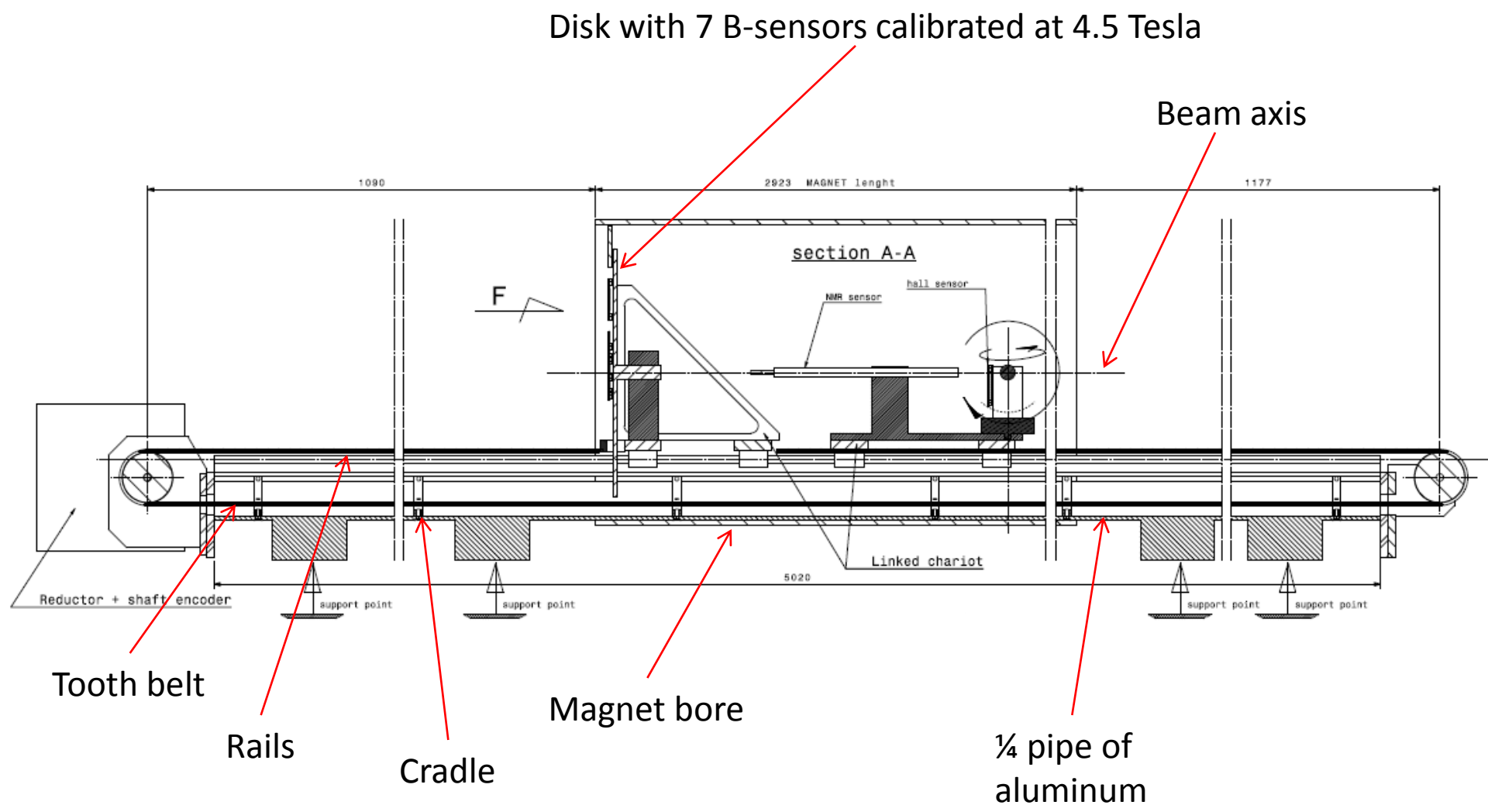
Service module to check calibration of B-sensors



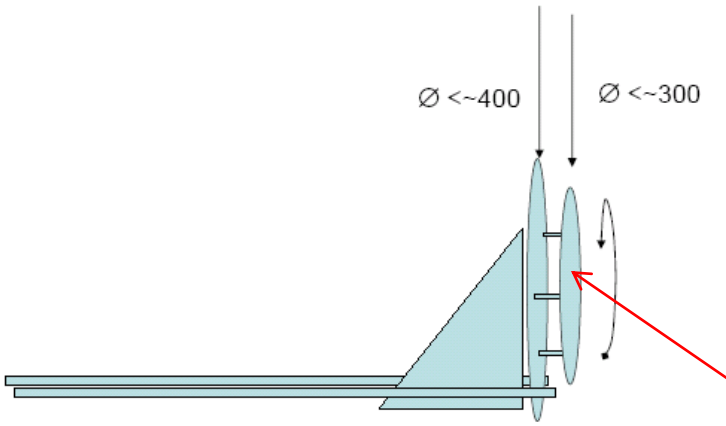
If necessary determine small corrections on main terms
(Y00, Y10 and angles between probes)

Service module

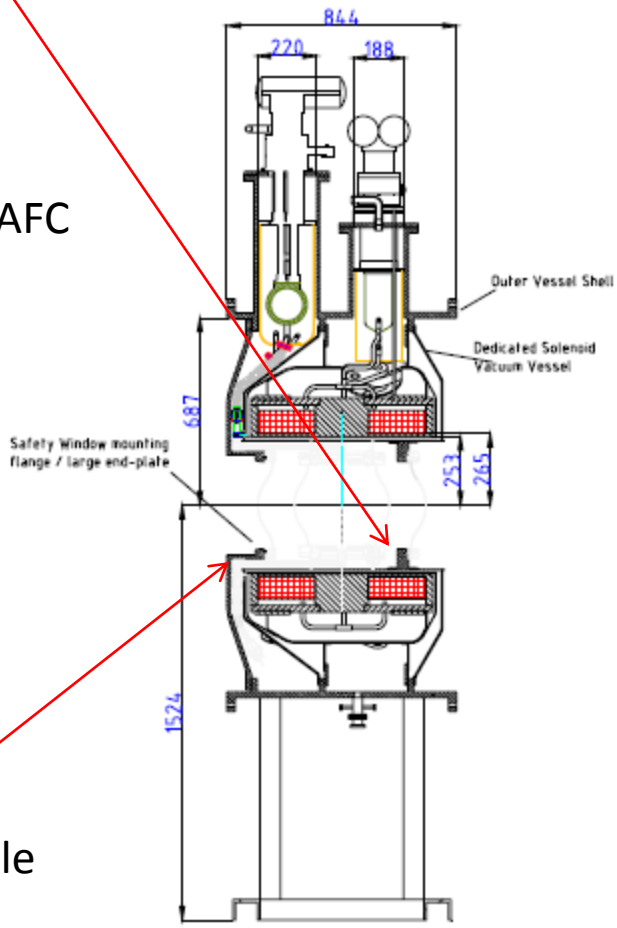



Disk with 7 B-sensors calibrated at 4.5 Tesla
Beam axis
1090
2923 MAGNET lenght
1177
section A-A
F
hall sensor
NMR sensor
Linked chariot
5020
Reductor + shaft encoder
support point
support point
support point
support point
Tooth belt
Rails
Cradle
Magnet bore
¼ pipe of aluminum

This flange cannot be removed and
cannot be surpassed by rail support



Extension disk for AFC

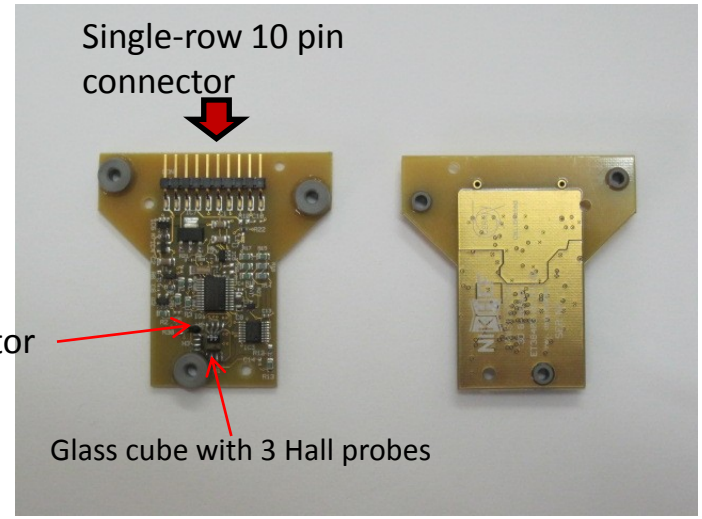


5m version for spectrometer solenoids
2m version for focus absorber solenoids.

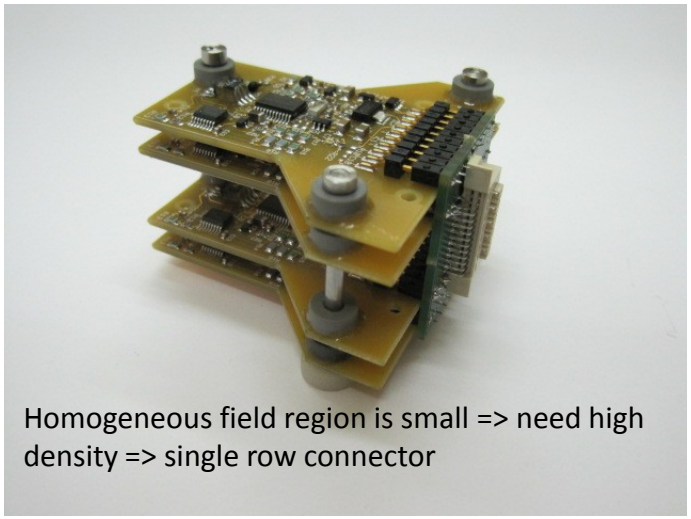
Extension disk to by-pass internal flange AFC
Need to measure from both sides

2m version could be used to measure eventually
coupling coils

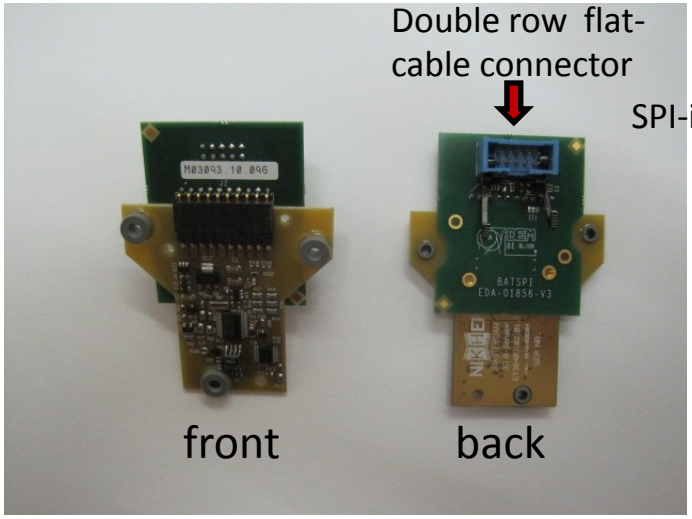
dismountable



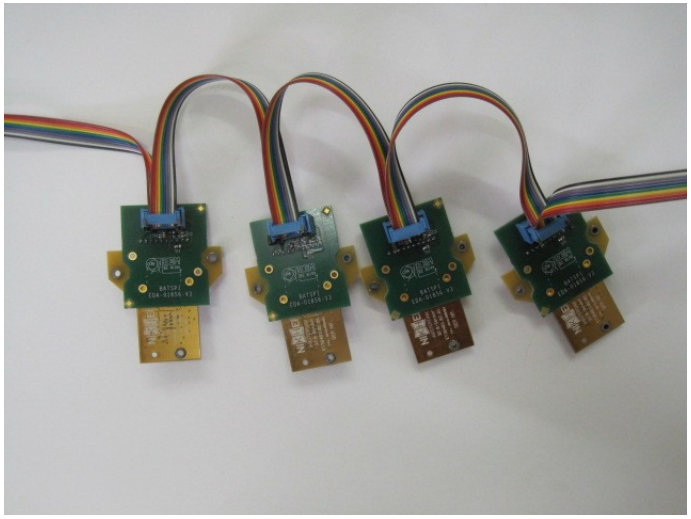
B-sensor card



Stack of B-sensors in calibrator



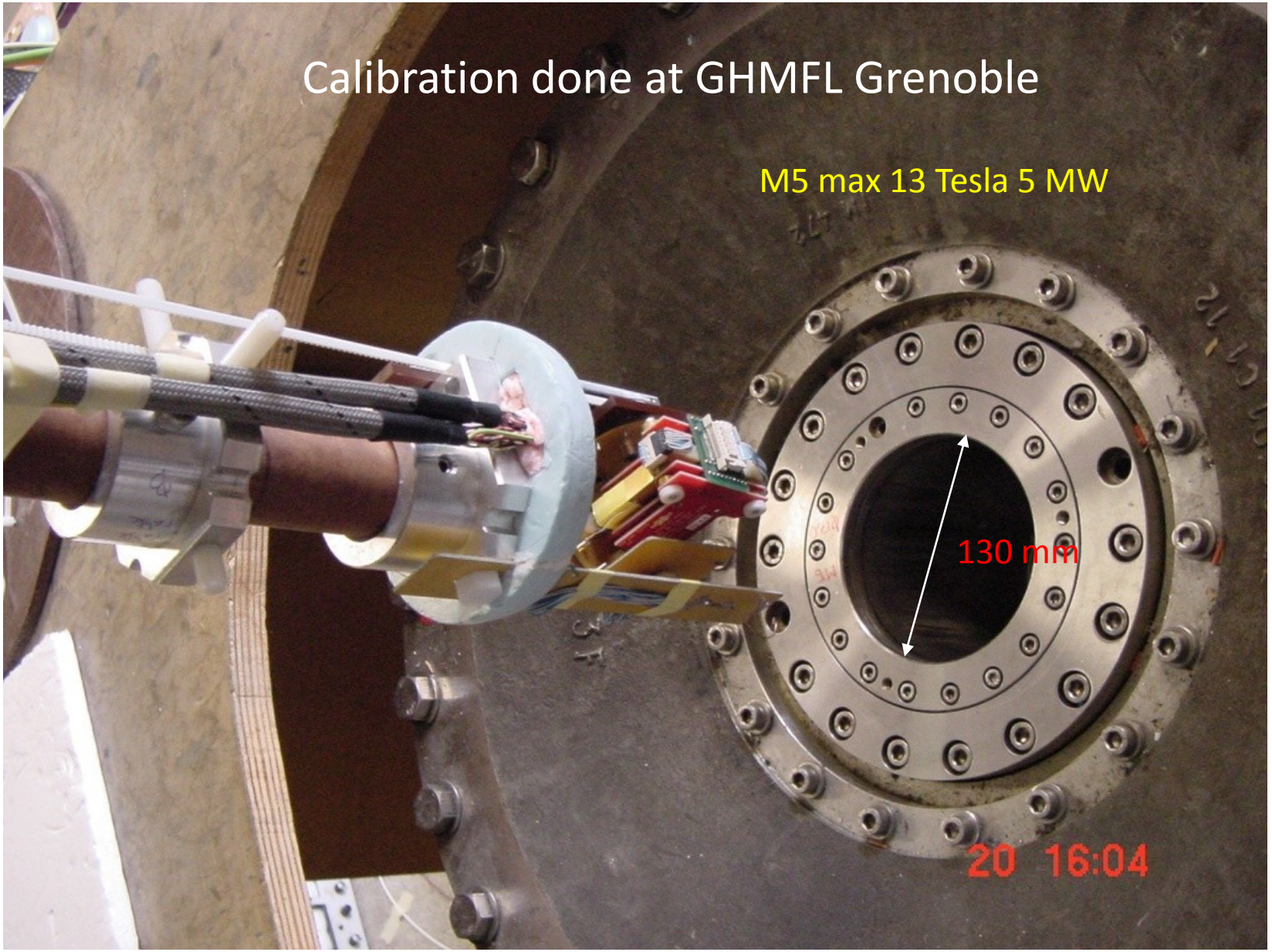
SPI-interface



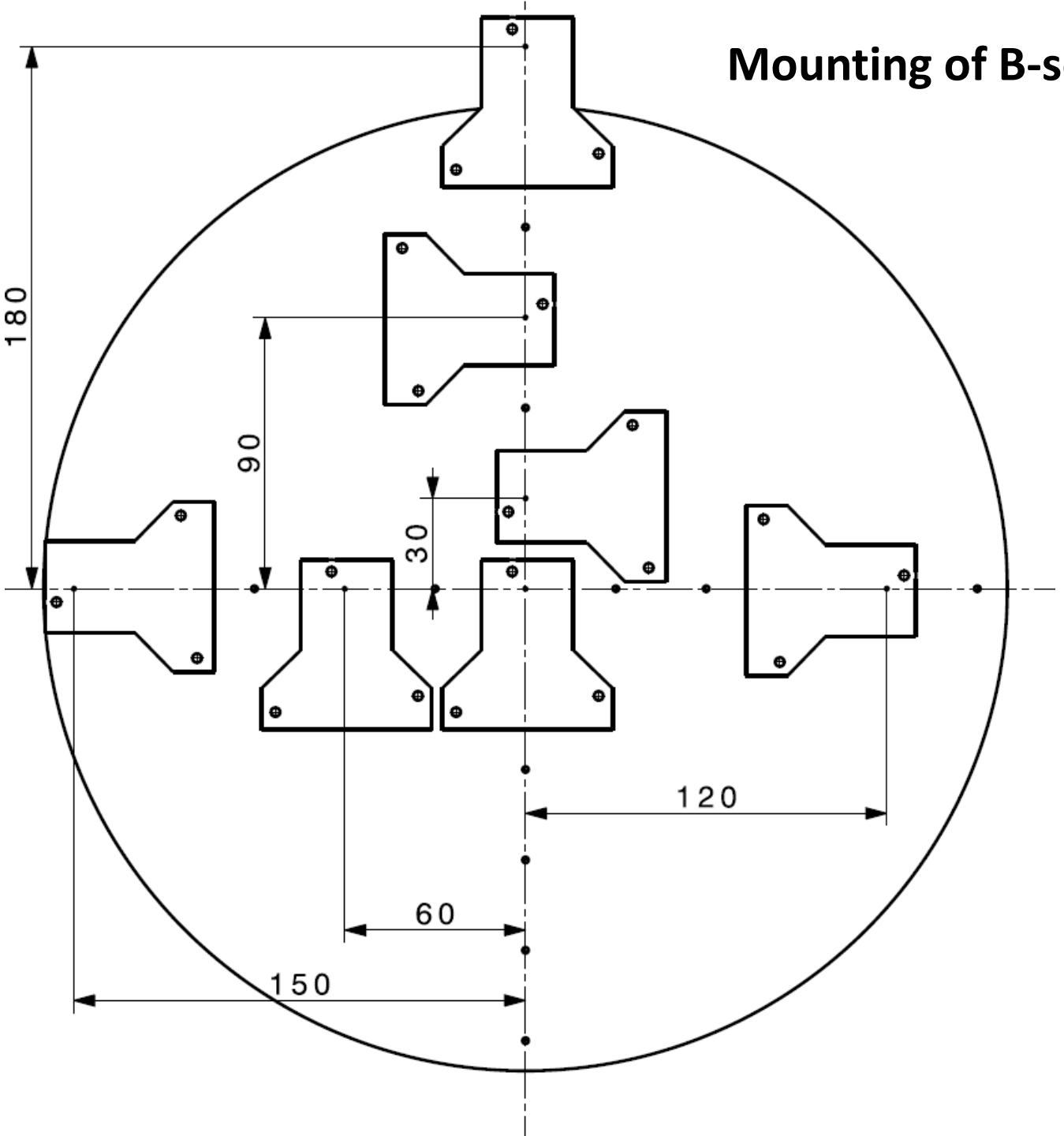
Passive backplane for B-sensor to carry double-row connector

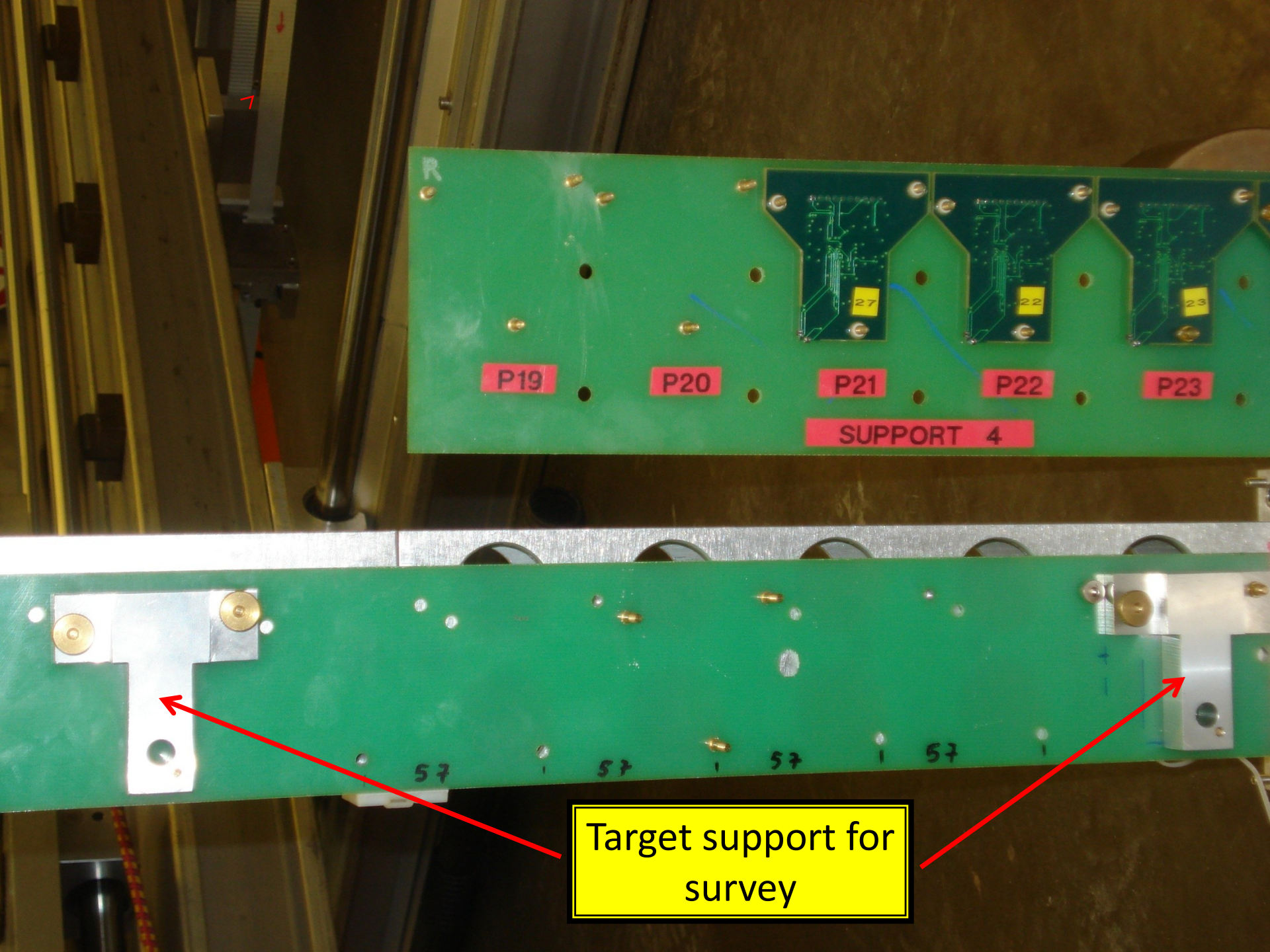
Daisy chain B-sensors

Calibration done at GHMFL Grenoble



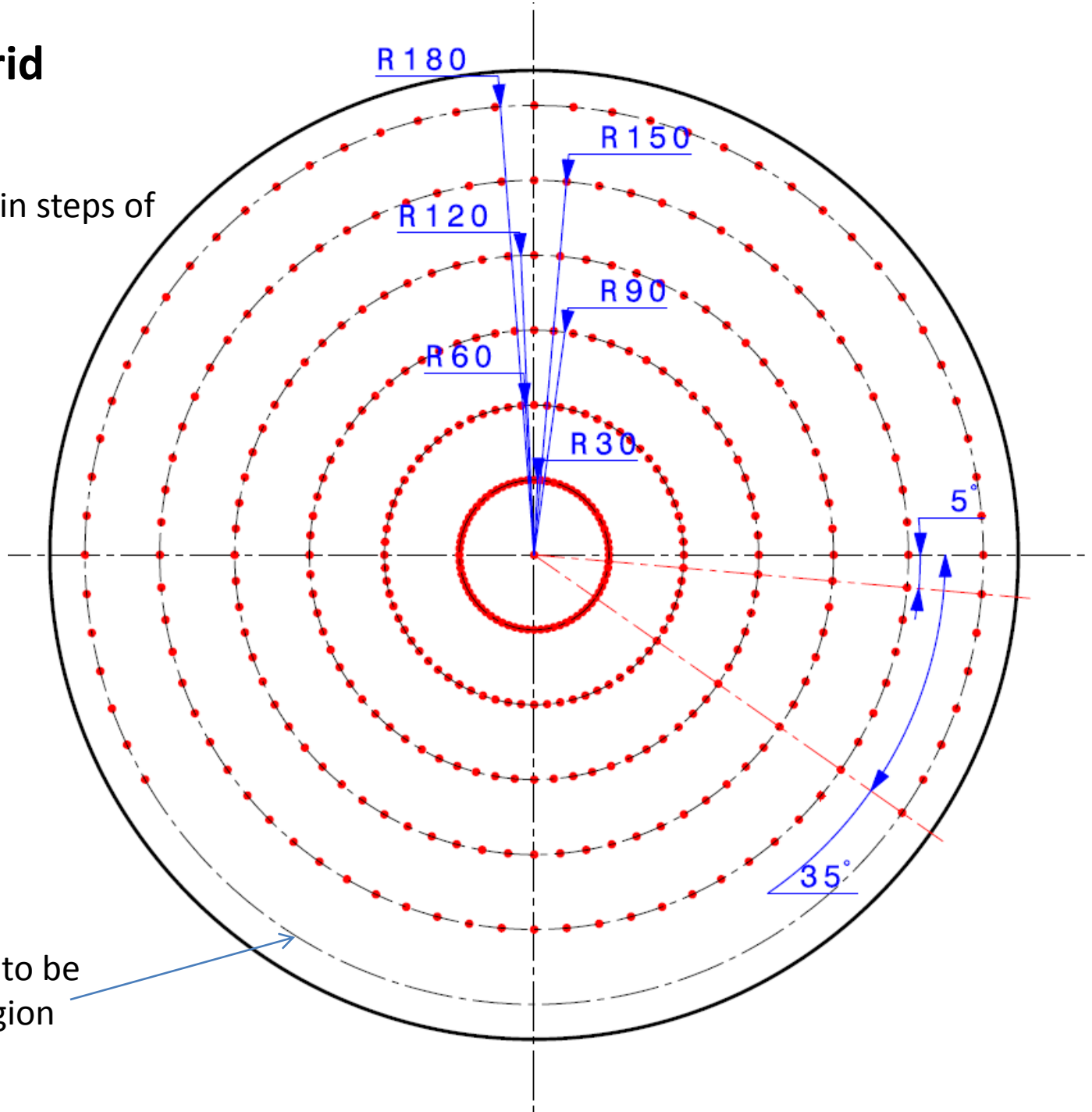
Mounting of B-sensors



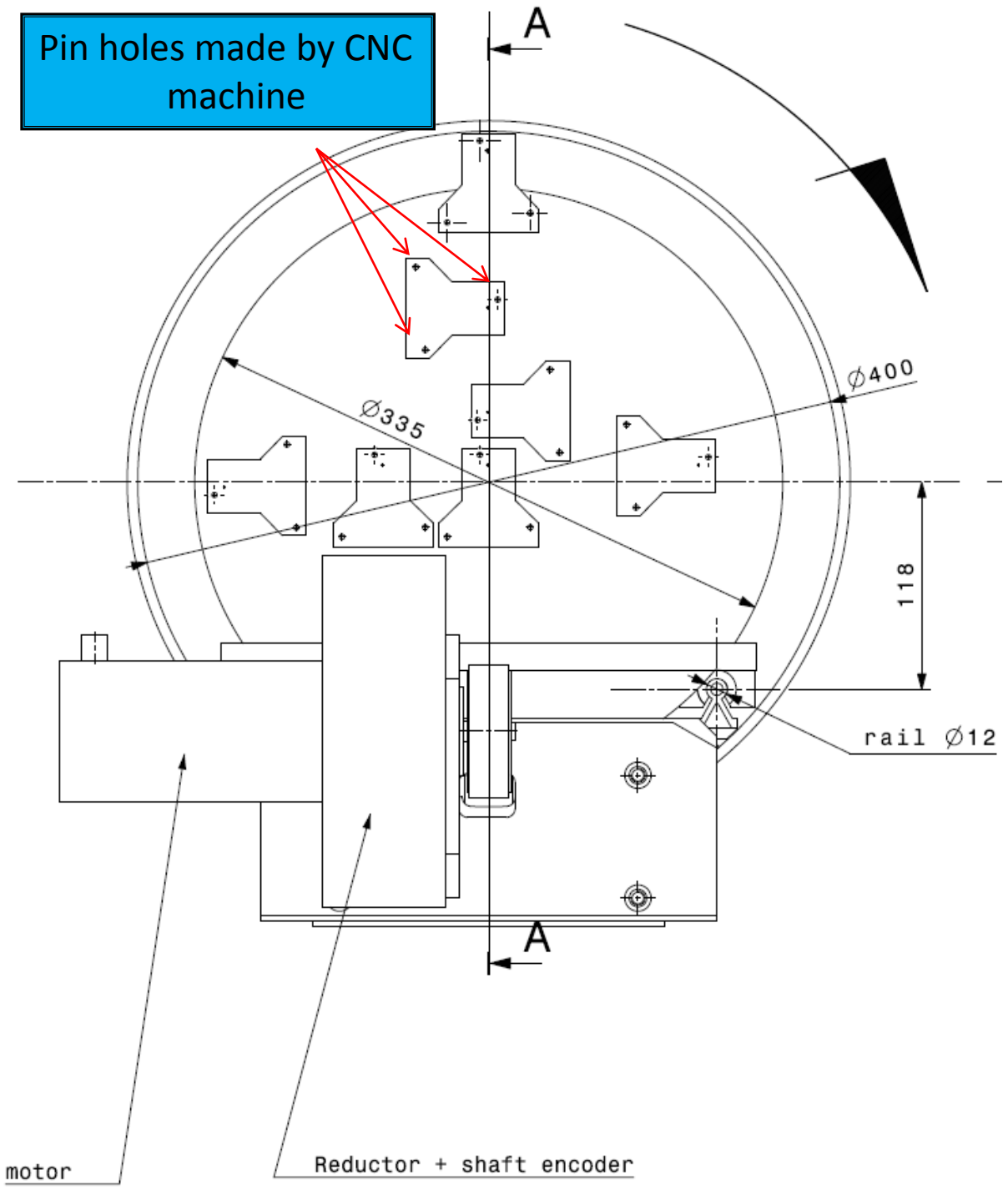

P19
P20
P21
P22
P23
SUPPORT 4
Target support for survey

Measurement grid

Disk can be rotated in steps of 5 degree



180 mm sensor has to be removed for this region


Pin holes made by CNC machine
A
Ø335
Ø400
118
rail Ø12
A
motor
Reductor + shaft encoder

Strategy mechanics:
1 build 5 m version , test precision with laser tracker
2 if precision insufficient add encoder and rack and/or
foresee laser tracker during measurements etc
3 build 2 m version

DAQ:
Build simple read-out for 7 B-sensors
Anticipate to have interface outside high field region

Accuracy:

< 0.5 mm longitudinal
+/- 0.5mm radial
Theta +/- 1 mrad
Bx,By,Bz +/- 2 mT Check in situ with NMR on service module

Status

6 m Alu pipe of 40 cm bore arrived, segment cut, principle seems to work

Cradles: designed, will be produced outside CERN, rectified inside CERN

Rails: ordered , will arrive in one month

Chariot: designed, must be build

Motion: standard BALDOR motion controller, drive and motor (available)

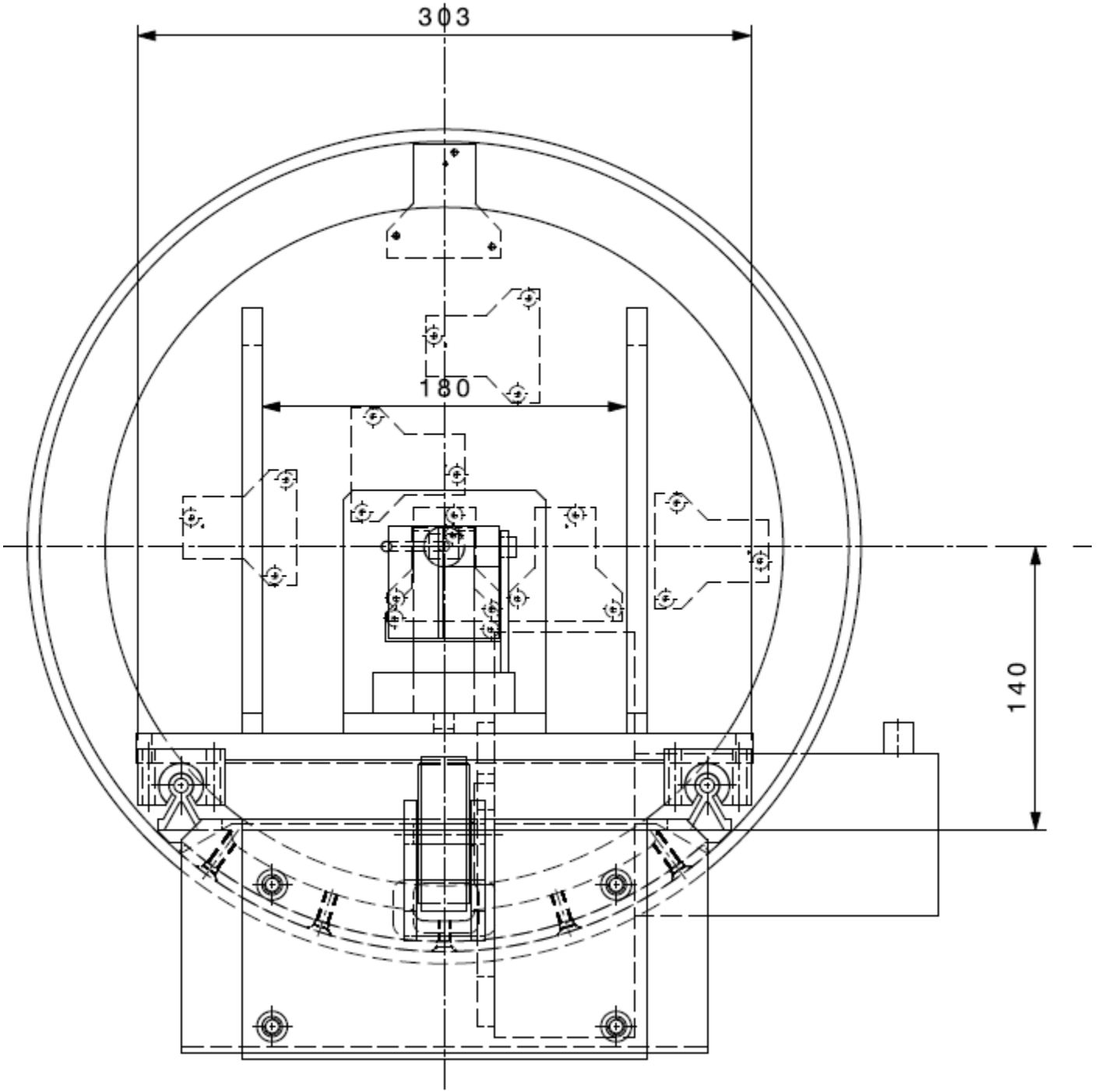
Maybe encoder on rack (unlikely), encoder exist, rack must be ordered

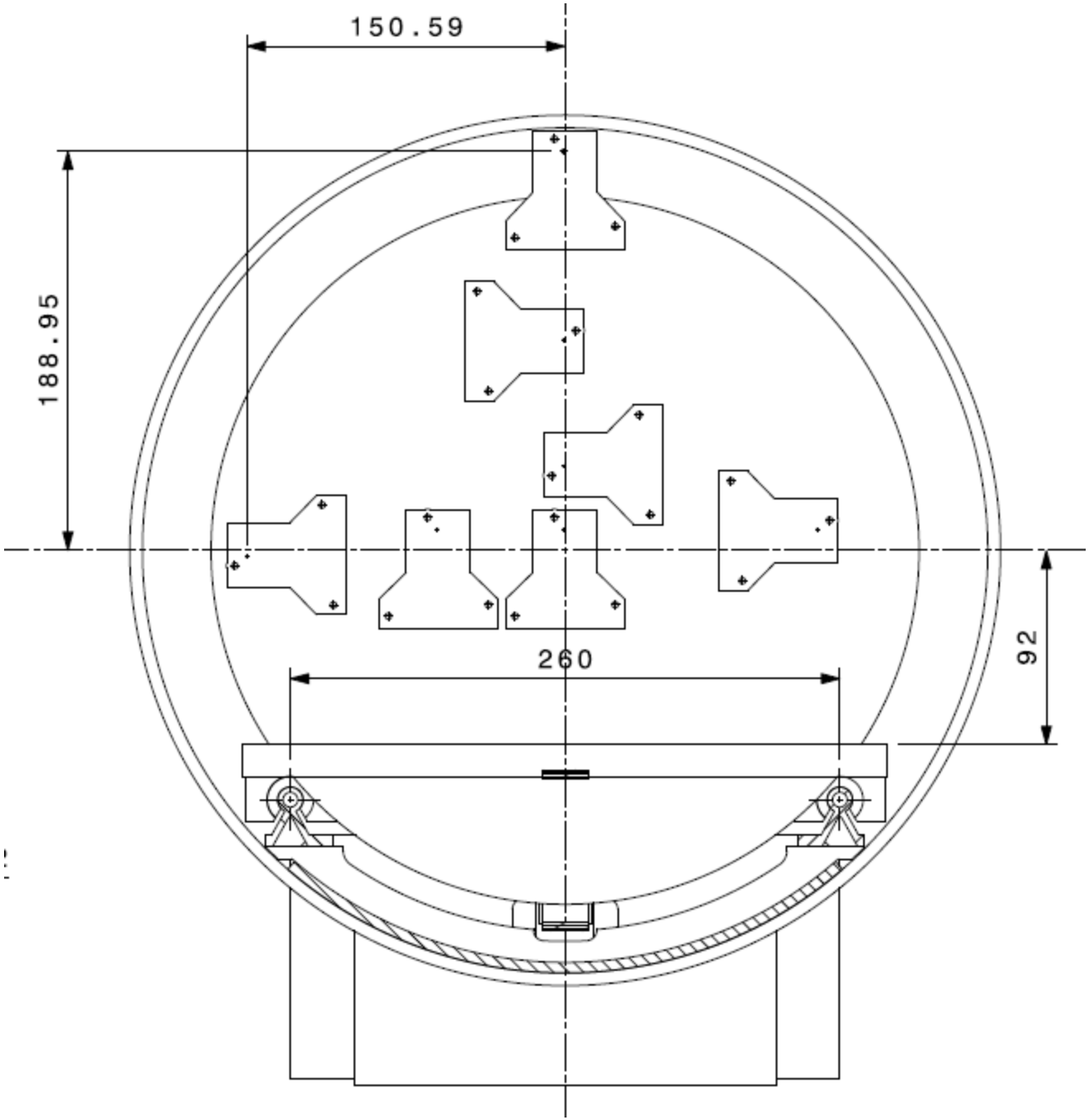
B-sensors ready and calibrated should be send to CERN !

Read-out: basics exist (used in calibrator with 4 cards), parts exist
duplicate electronics board

Ready at August 2011 for AFC (small version)

Spare slides


303
180
140


150.59
188.95
260
92