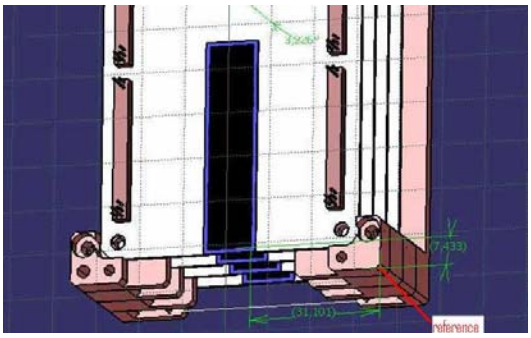
Detector-beam alignment

1. Introduction :

The aim of this document is the description of methods and resources to obtain alignment of detectors relatively to the beam.

2. Principle :



2.1. Position of the first strip of detectors is measured at lab by optical method. Measure is made (precision ± 10 µm) for each detector plan relatively to body axes of its support. (reference)

2.2. Position of these body axes supports relatively to the chamber is made by TJNAF alignment team (precision ± 70 µm). Geometers feel references on detector bloc and measure their position in relation with 3 (minimum) tooling balls on upper flange. This operation is made when the upper flange is outside the box. (see annex view)

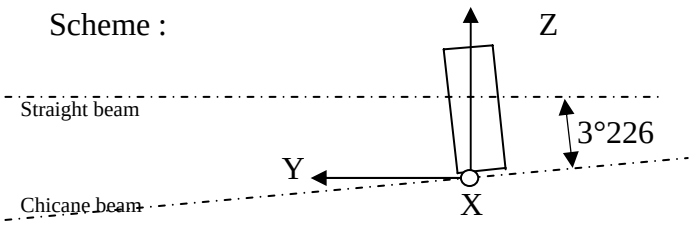
2.3. After closing the box, position of detector is known by deduction of upper flange position measurement. Alignment team can measure between tooling balls and beam (precision ± 500 µm at least). A window is foreseen to give possibility for geometers to see detector bloc.

2.4. To correct alignment with beam, we can move then the whole vacuum chamber by actions on 3 cartridges that support it.

The vertical movement of detector is settled independently.

3. Description :

Scheme :



3.1. Axis precision :

Tz : motor controlled (C=120mm)	± 0,05 mm	
Rz : low precision	± 5°	
Tx : link to width detector (10mm)	± 0,5 mm	
Rx : link to chicane beam	± 0.05°	Adjustable from 2 to 4°
Ty : low precision	± 0,5mm	
Ry : low precision	± 5°	

3.2. Marks :

Marks used on upper flange are TJNAF tooling ball Ø 1/2 " (ref : 31325A27). Seven of them are placed on the upper flange, visible by geometers and one is link to the vertical translator.

Geometers can use holes,faces and wires on assembled detectors to get positions. (See annexed views)

3.3. Mechanical positioning :

Silicium strip are glued on ceramic PC board. This positioning (strip/circuit) must be done at ± 20 µm (cf. Canberra)

Each detector is positioned in a compartment-support. The 0.08mm shift between each plan is set by optical control and adjustment during assembly (precision ± 10 µm).

Plan to plan location is made by dowel pins. (Shift precision ± 5 µm)

The bloc detector (4 plans assembly) is connected to the translator flange (with dowel pins).

3.4. Alignment precision :

Alignment team can make measurement on tooling balls at ± 100 µm

3.5. Adjustments :

Adjustment of vacuum chamber to the beam will be made by using 3 TJNAF cartridges (ref: 22512-D-0027). This operation is made with alignment team.

Vertical adjustment is then filled up by motor control.