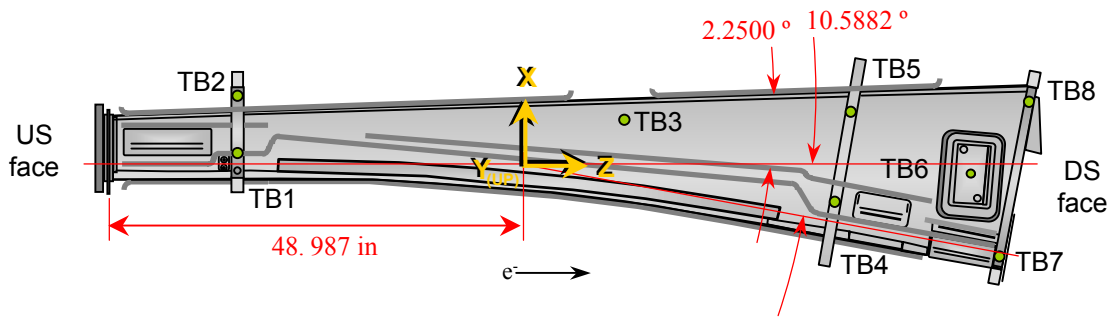
Vacuum Chamber Datum
BM1 Case

Goal identical to QFC:

1. Find mid-plane of the chamber: 3 dof (pitch, roll, y)
2. Find axis of the chamber: 2 dof (yaw, x)
3. Find origin of the chamber: 1 dof (z)



Datum Definition

1. The mid-plane of the chamber is based on the scans just like in the QFC case.
2. The z axis is based on a combination of measurement on the outside straight wall, the inside curved wall and nominal values.
3. The origin of the chamber is the vertex point. It is at a nominal value from the US face.

Procedure for 1380 Step

Take the twist out of the chamber by using sight level at both ends.

Use the mouse: calibrate – drag (measure every inch) – calibrate. Do it twice.

Measure 1 point US and 1 point DS of the inside curved wall. Do it twice.

Measure 1 point US and 1 point DS of the outside straight wall. Do it twice.

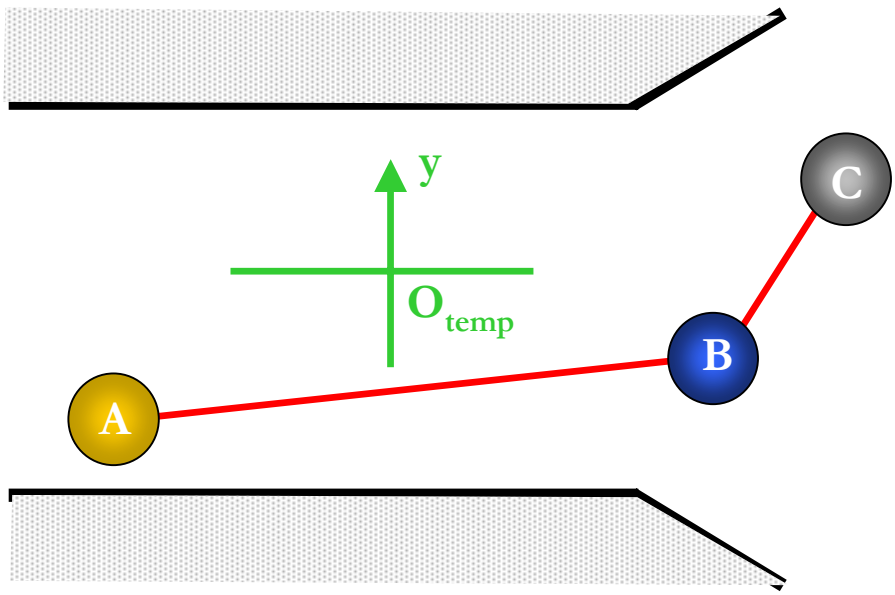
Scan the surface of the US chamber face.

Scan the surfaces of the DS flange, the DS support and the Exit port.

Survey the 8 TBs and the 6 temporary points from 3 stations.

Datum Computation Part 1: Finding the mid plane

The mid plane is established using the exact same template as in the QFC case. At this stage, we have a temporary datum.



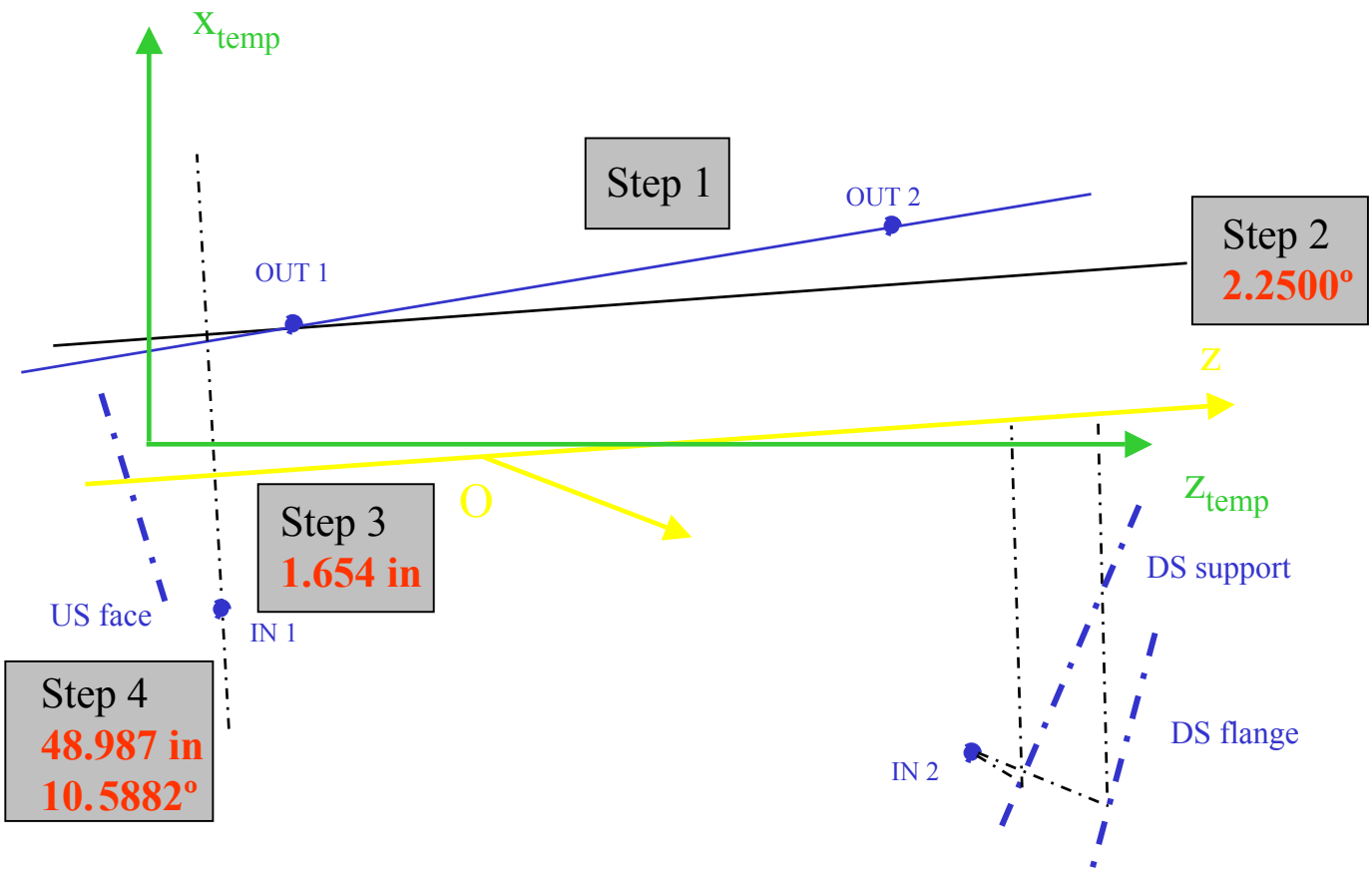
O_{temp} average of the beginning of the scans

z_{temp} average of the 3 corrected scans

x_{temp} perpendicular to (z_{temp} , y) plane

y normal to the plane of the corrected A, B scans

Datum Computation Part 2: Finding the z axis and the origin O



BM1003 Results Part 1

- Network Adjustment
  - Degrees of Freedom 51
  - A Priori Standard Deviation
    - Distance 1mil
    - Horizontal Angle 0.0006º
    - Vertical Angle 0.0006º
  - Variance Analysis
    - Distance 0.516514
    - Horizontal Angle 0.351208
    - Vertical Angle 0.501724

- Datum Verification
  - IN2 on DS support 11.915 in => 3 mil
  - IN2 on DS flange 11.960 in => 2 mil

BM1003 Results Part 2

- Plane Orientation: Yaw
  - DS support 79.3775º => -0.0343º
  - DS flange 79.1643º => -0.2475º
  - DS exit port 88.5792º => 0.0289º
  - US face 0.0587º => 0.0587º

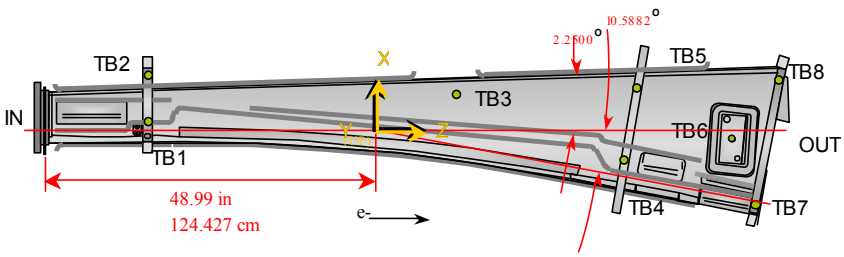
- Plane Orientation: Pitch
  - DS support -0.0076º
  - DS flange -0.0364º
  - DS exit port 0.0553º
  - US face 0.2477º

Preliminary Web Report Page 1

Fiducials for BM1 Std. Vac. Chamber	*Serial No.*

Date: Chamber: Operator(s):

Notes:



Fiducial Coordinates for BM1 Standard Vacuum Chamber: (inches)

Fiducial	Z	X	Y
TB1			
TB2			
TB3			
TB4			
TB5			
TB6			
TB7			
TB8			
TB9			
TB10			
TB11			
TB12			
	inches	inches	inches

Exit Port: Near TB8	
Measured	
Nominal	
Difference	
STATUS:	PENDING

Exit Port: Near TB7	
Measured	
Nominal	
Difference	
STATUS:	PENDING

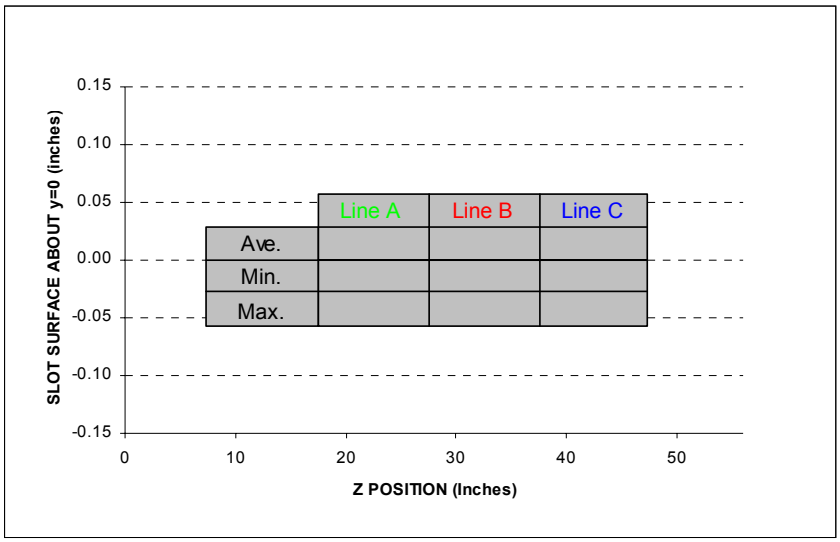
Source: Fid. Step

Description:

Fid. vals based on internal chamber datum. Source="US Step" indicates final data unless rechecked.

Preliminary Web Report Page 2

Fiducialization Step: (Traveler Step # 1380)



Serial No.

Step 1: *Fiducial and Flange Coordinates for QFC Std. Vac. Chamber*

Fiducial	Z	X	Y
TB1			
TB2			
TB3			
TB4			
TB5			
TB6			
TB7			
TB8			
	inches	inches	inches

Downstream Ports

Exit Port: Near TB8	
Measured	
Nominal	
Difference	

Exit Port: Near TB7	
Measured	
Nominal	
Difference	

Upstream Port

Upstream Port	
Measured	
Nominal	
Difference	

Downstream Support	
Measured	
Nominal	
Difference	

Description:

Fiducial values based on internal chamber datum.