Coordinate system for the GIF as defined for CMS RPCs

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13 Oct 2015

Aims

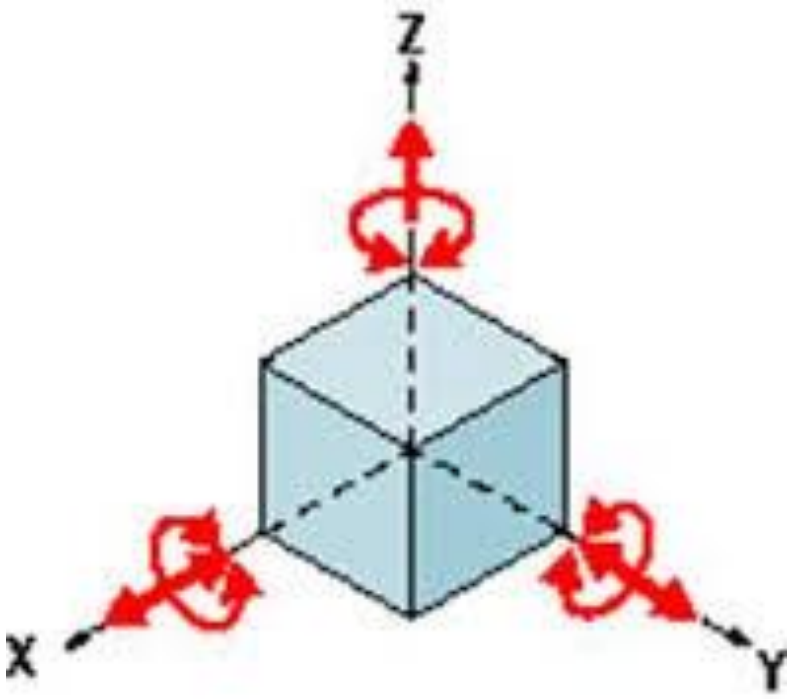
- Establish 2 measured parameters to readily keep up to date the diagram of the chamber positions in the GIF++.
- Establish the coordinates of the chamber position with respect to the source and nominal beam positions.

Contents

- Defining the coordinate systems
- Base Bunker diagram (no details, gas panels etc)
- Trolley specification, with present chamber position.

Our chambers have potentially 6 degrees of freedom.

We will only deal with translations and no rotations



Steps to defining the strip position

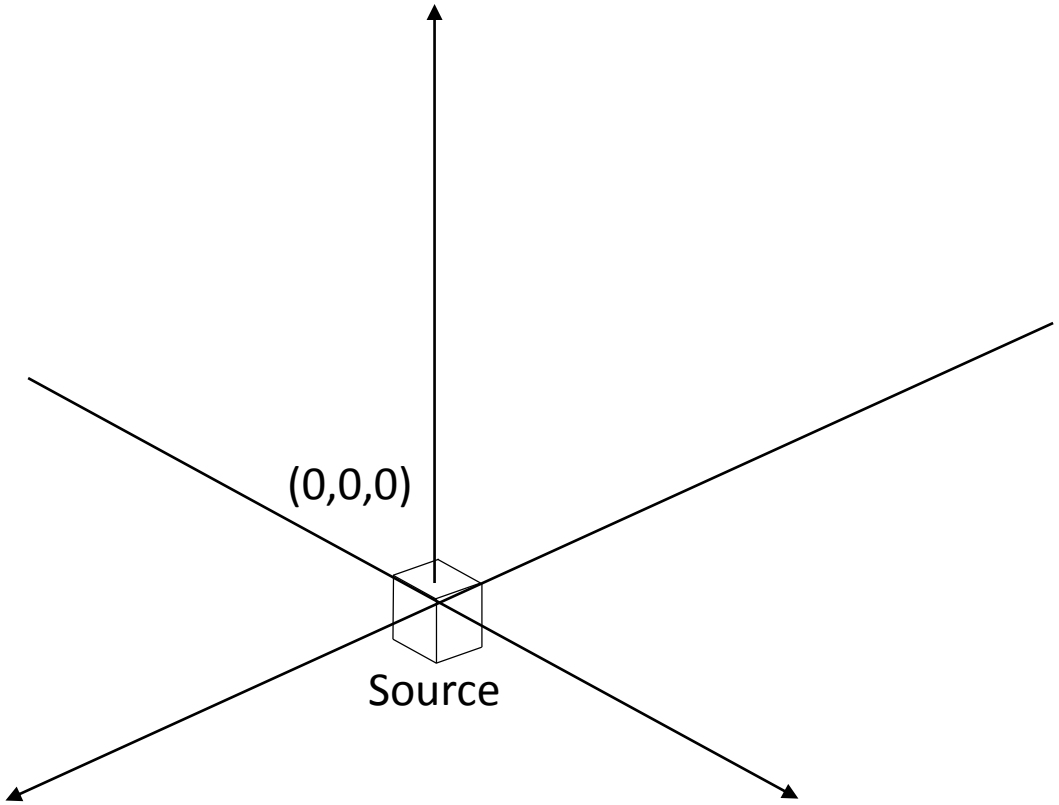
- Measurement of each trolley position (X,Z) within the Bunker volume.
- Definition of each chamber in the trolley, (X,Y,Z)
- Definition of each strip or eta division within the chamber structure.

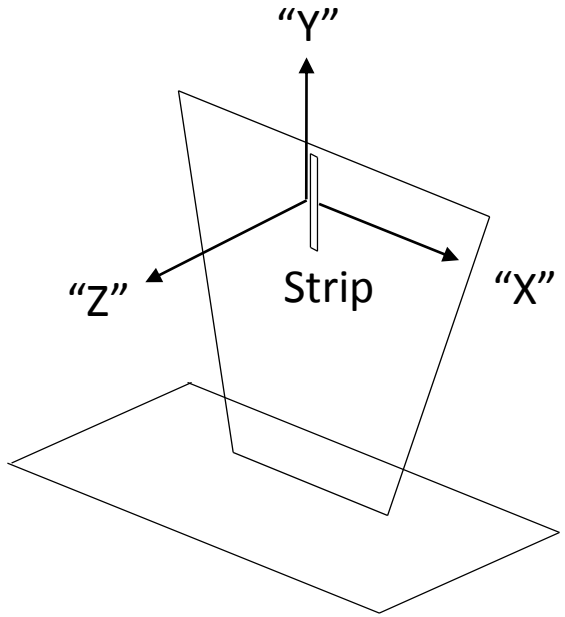
- Nota the case of the rolling chambers in T0/3 must be defined wrt the trolley and or the Jura wall for each “X” position.

Diagrams and Referentials

- Diagram defining the possible positions of the trolleys within the bunker, constrained by cable trays, Gas PP, rails for TGC shielding etc.
- First establish base diagram of Bunker & infrastructure for establishing chamber position wrt the beam and source .
- Second referential points on the trolleys wrt the source centre.
- Third the location of the chambers wrt ref point on the trolleys.
- Fourth the position of the strips wrt the trolleys.

Final strip spacial definition with respect to Source in X,Y & Z.





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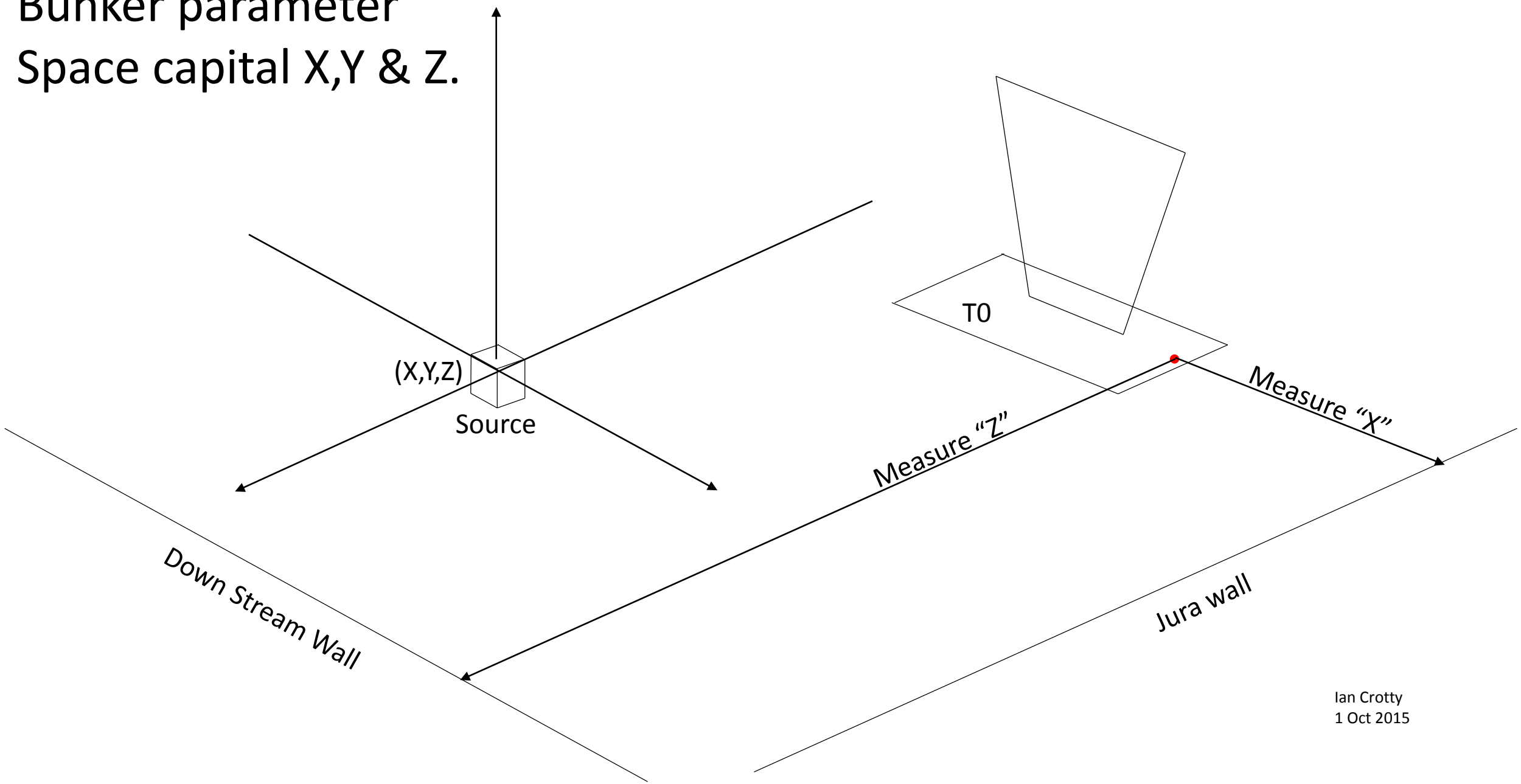
1 Oct 2015

Bunker parameter
Space capital X,Y & Z.



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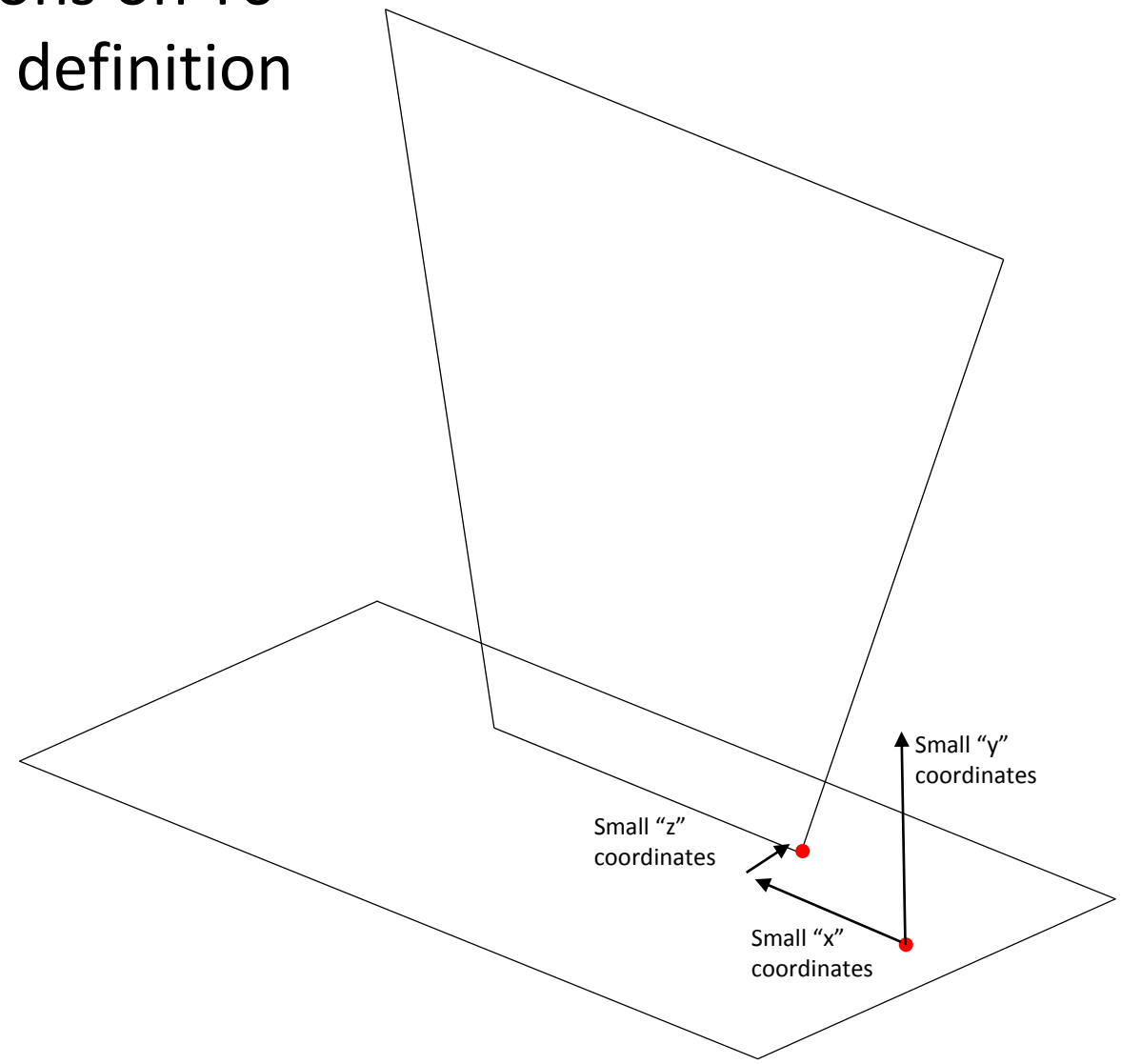
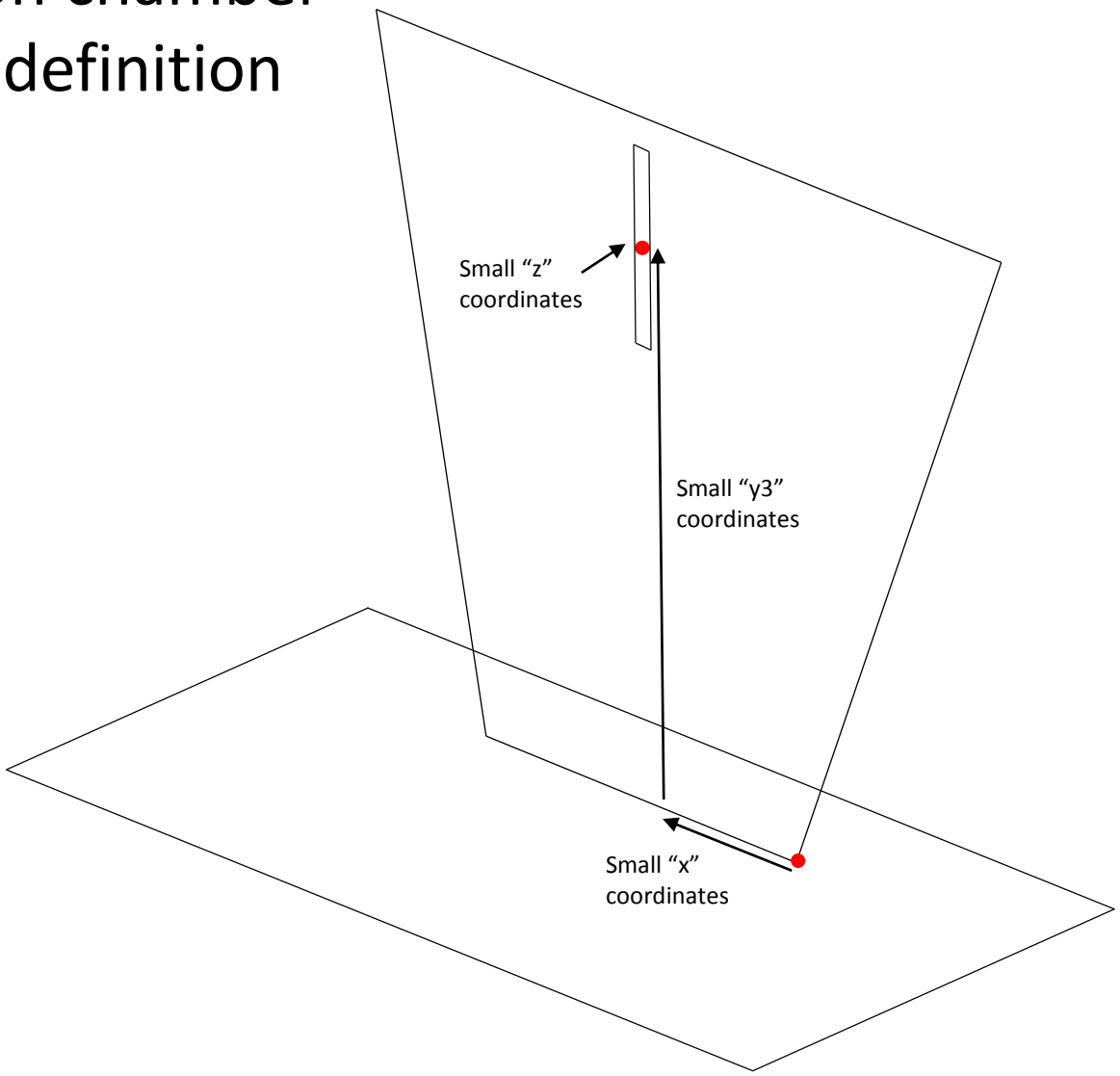
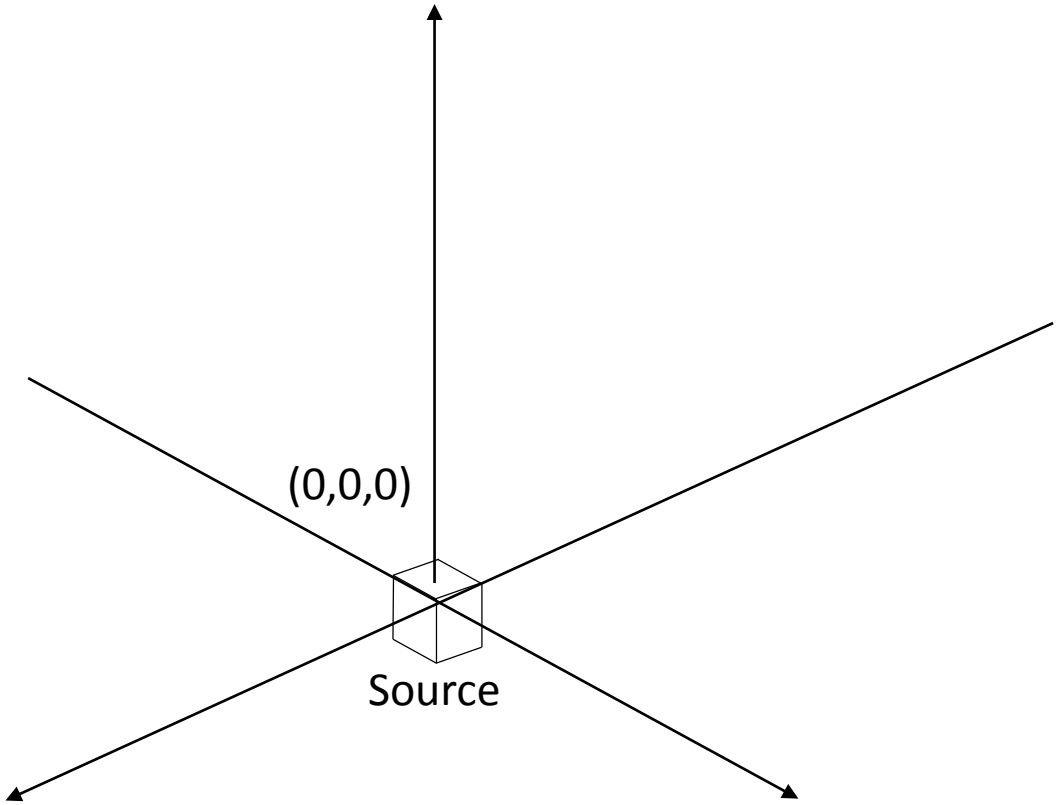
Chamber positions on T0
2nd Co-ordinate definition

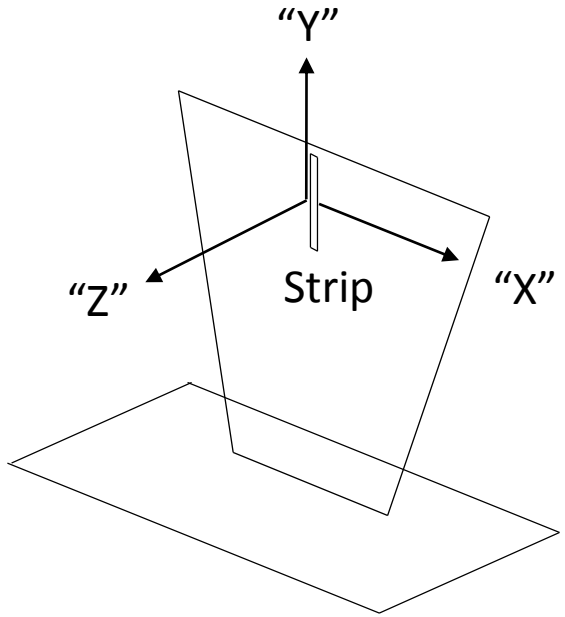


Strip positions on chamber
3nd Co-ordinate definition



Final strip spacial definition with respect to Source in X,Y & Z.





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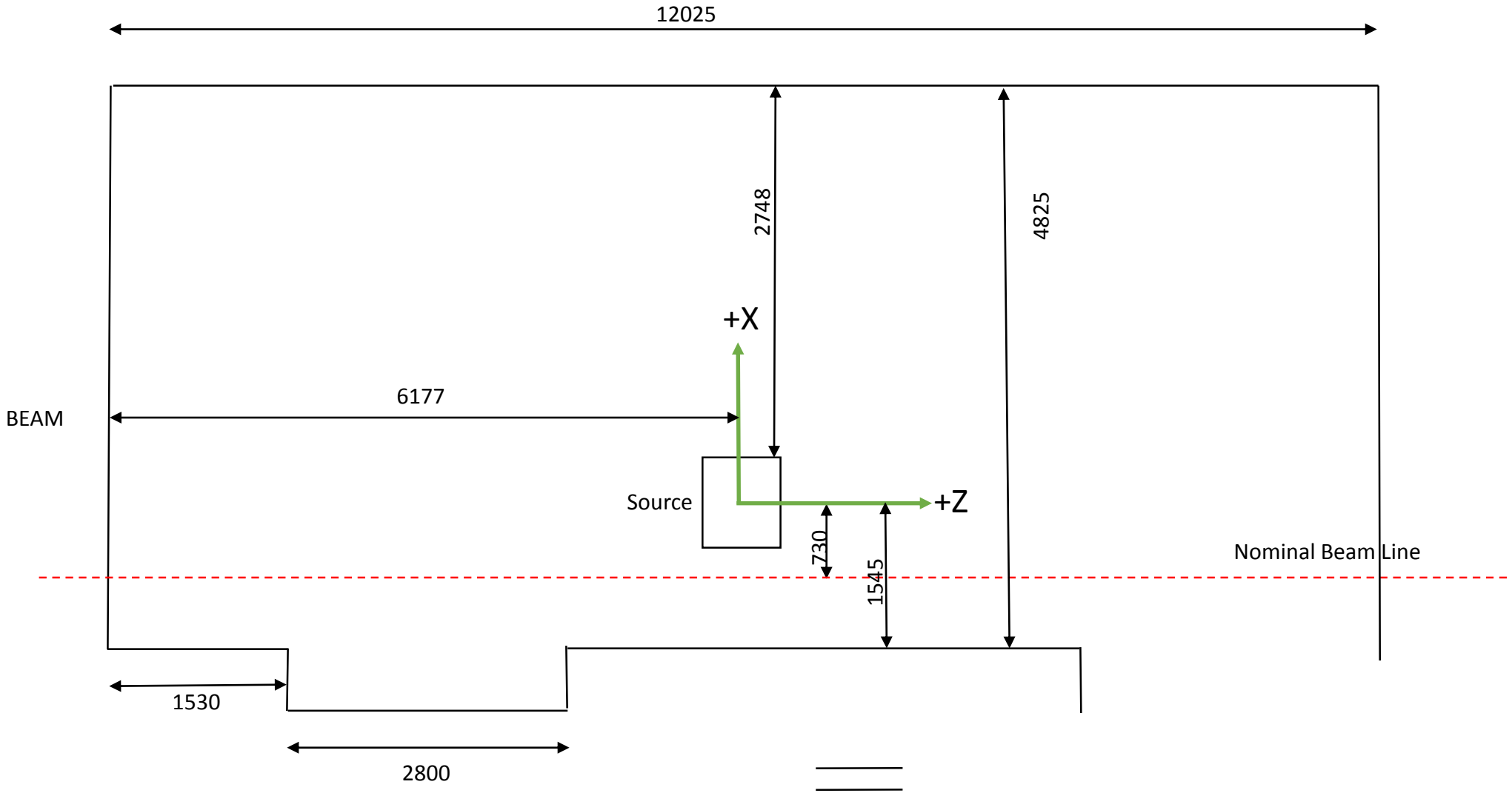
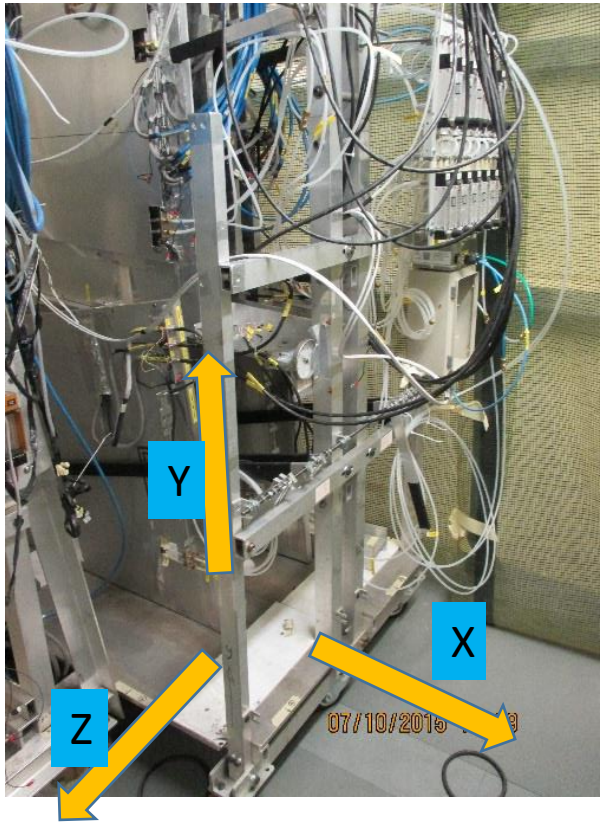
Base diagram of facility

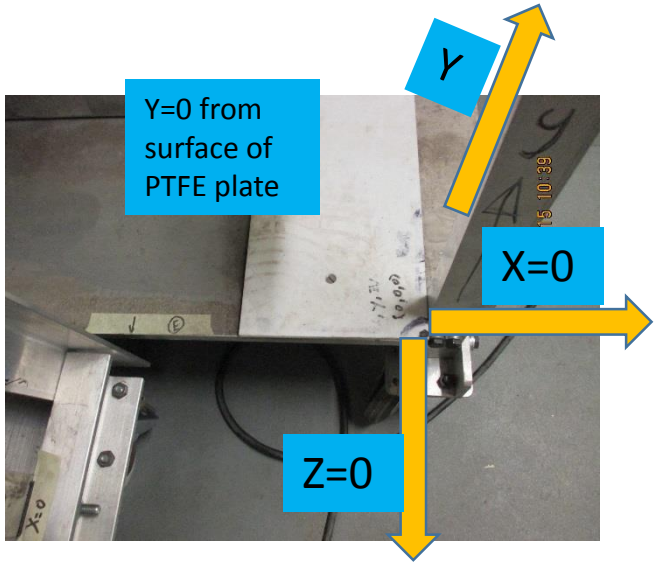
- X = 0 @ Centre of source positive values are towards Jura with the source at 2748 + 530mm = 3278mm from Jura wall.
- Y = 0 @ Centre of source positive values upwards.
- Z = 0 @ Centre of source positive values are down stream.
- Nominal Beam and source are 1640mm above steel floor (LHC ref 2060mm above 887 hall floor).
- Source aperture open angle = 74degrees.
- Bunker height upstream 4386mm
- Bunker height down stream 5183mm

Base diagram

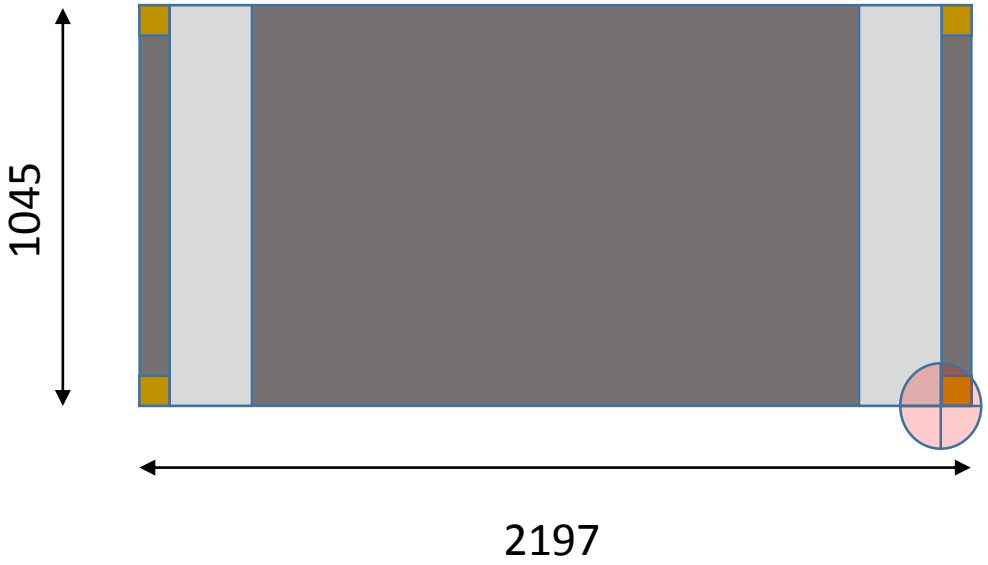


Trolley T1 specifications and ref points



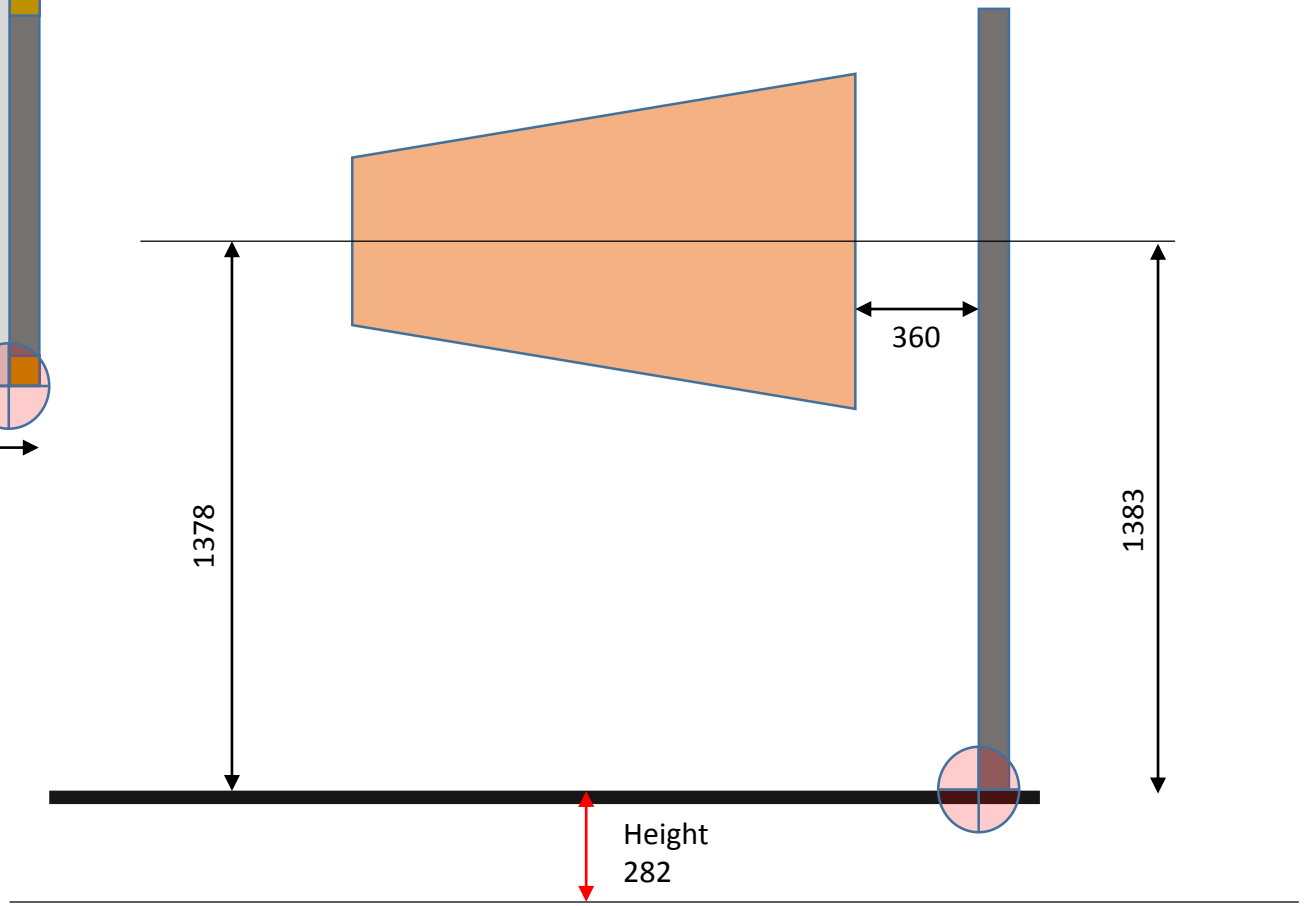


T1 zero ref points and chamber positions

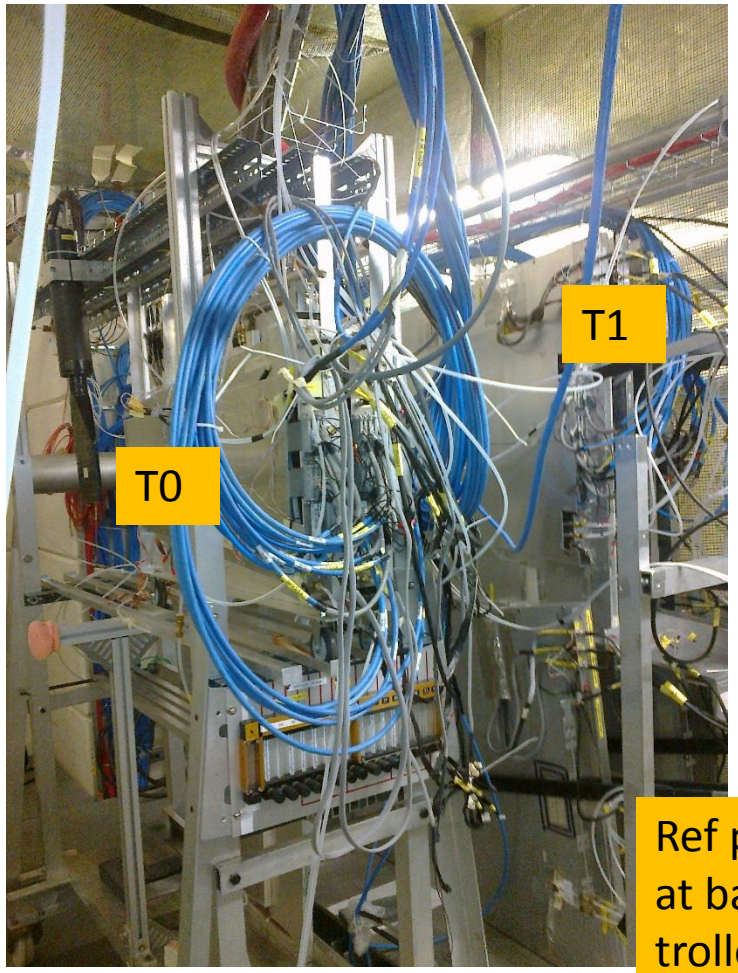


Represents
(0,0,0)

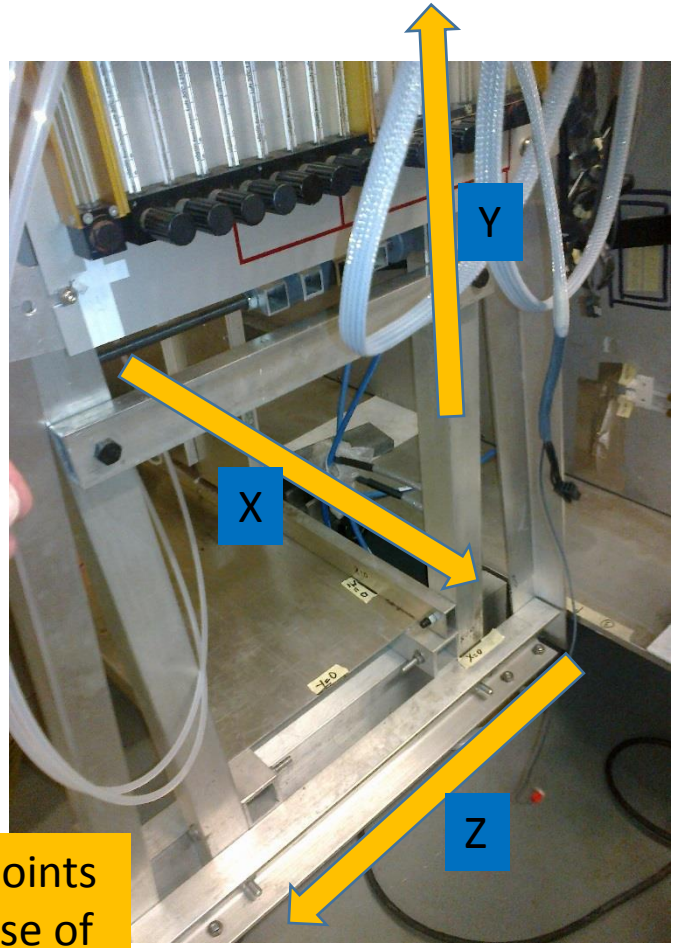
Position in
Z ??

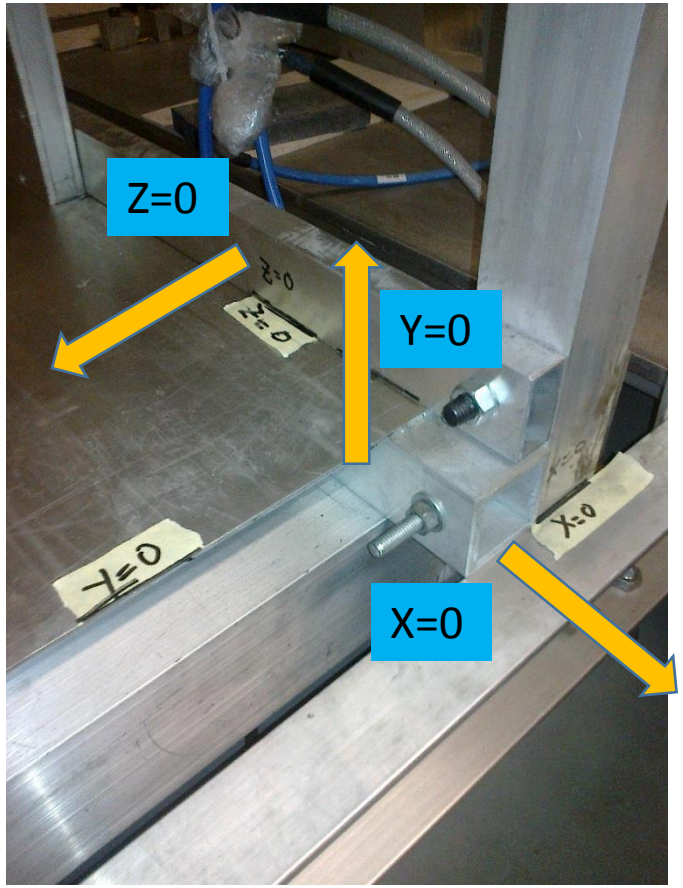


Trolley T0 specifications and ref points (1)



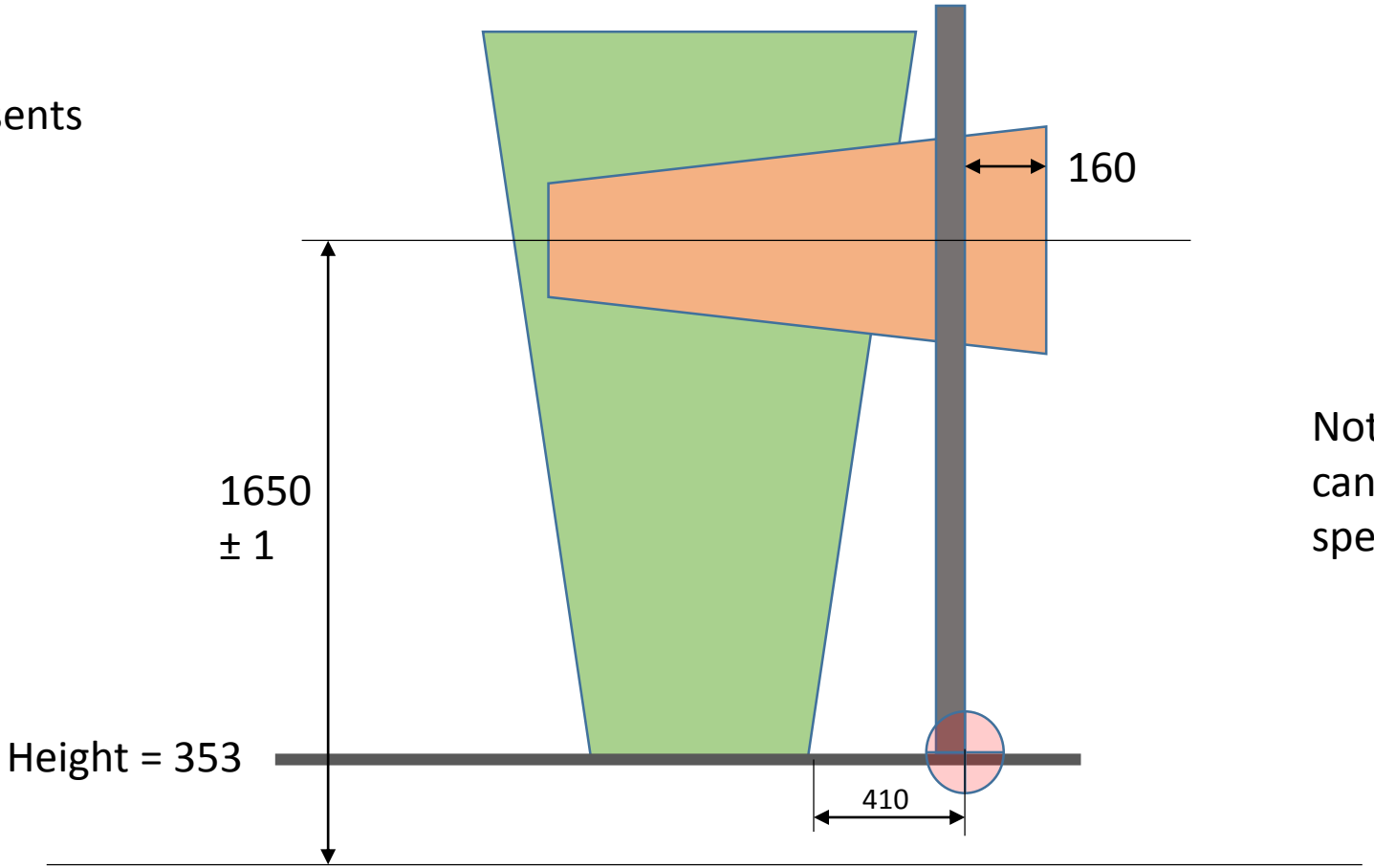
Ref points at base of trolley T0





T0/3

Represents
(0,0,0)



Nota. The horizontal chambers can roll in “x” so must be specified for each new position.

Positions Trolley 30Aug to 16 Sept 2015

T1

- Ref point to Jura wall 2770mm
- Ref point to upstream wall 2509mm
- Ref point to Saleve wall 2856mm.

T0

- Korea chambers from Jura wall 3104mm
- Front Korea chambers to source 3229mm
- Korea chambers occupy a Z space of 194mm

Positions Trolley 16 Sept to 8 Oct 2015

T1

- Ref point to Jura wall 1507mm
- Ref point to upstream wall 1529mm
- Saleve wall to trolley edge 1292mm.

T0

- RE vertical chamber from source 4447mm
- Korea, front, chamber from source 4185mm
- Korea chambers to Saleve wall 2846mm
- Korea chambers to Jura wall 1731mm

- Glass RPCs frame from source 1892mm

Glass RPC 24 Sept 2015

- Glass RPC closest to source centre (not the frame) is 2129mm in Z.
- X and Y are not known/measured.

Coordinate table to convert Bunker wall measurements to trolley coordinate system.

30 Aug to 16 Sept 2015

Source to down stream wall = Zs		
Source Upstream	6177	

Source to Jura wall		3278
Source to Saleve wall		1[illegible]5
Source to Alcove wall		2350

T1 = 282 above floor		282
T0 above floor		353

		Zm	Zm	Zs	Zs	[+]Zf
		Down stream wall	Upstream wall	Down stream	Upstream	
30Aug to 16 Sept	T1		2509	NA		-3668
	T0					
	Korean chamber				3229	-3681
16 Sept to 8 Oct	T1		1529			1648
	T0					
	Vertical Chamber				4447	
	Korean Front					

Xm	Xm	(+)Xf
Jura wall	Saleve wall	
2[illegible]0		508
	2856	506
3104		174
1507		1771
	1292	253

Ym	Ym	Yf
Floor	Trolley	
		-1358
		-1287
		-1358

Source 1/2 valu in Z		452
Source 1/2 valu in X		530
Source above floor		1640

Document is here; http://rpc-cms-re4-upscope.web.cern.ch/rpc-cms-re4-upscope/RPC/GIFPlusPlus/Installation/Coordinates/CoordinateGIF05Oct2015.xlsx

Position of chambers within Trolley.

T0

- Base of RE type 2 is 355mm above steel floor.
- Base of RE type 2 is 415mm from ref point.
- Centre of RE type 2 is 764mm from ref point.
- Front face of RE2 is 10266mm from down stream wall.
- Korean chambers above steel floor are 1650 ±1mm.
- Horizontal rails (L>1.6m) above steel floor are 1250mm.
- Dimension between uprights is 1390mm.

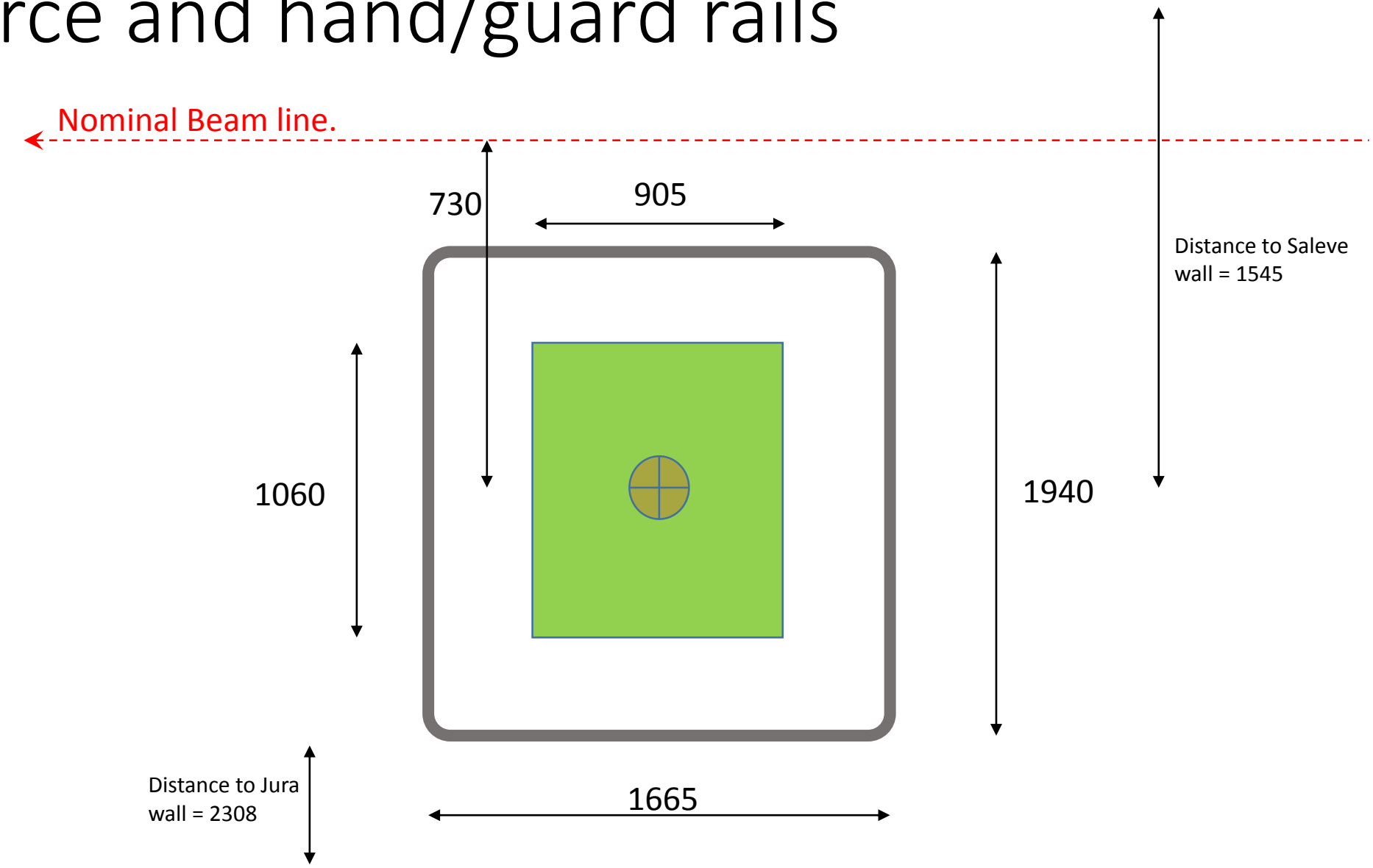
T1

- RE type 2’s Centre Line are 1665mm above steel floor.

Available space to manoeuvre Trolleys in Bunker

- Hand rail to far end of alcove is 3620mm.
- End of alcove to down stream wall less shielding rail for TDC is 1400mm.
- Gas panels are 250mm from wall. And 100m for piping.

Source and hand/guard rails



Subdetectors occupation in “Z”

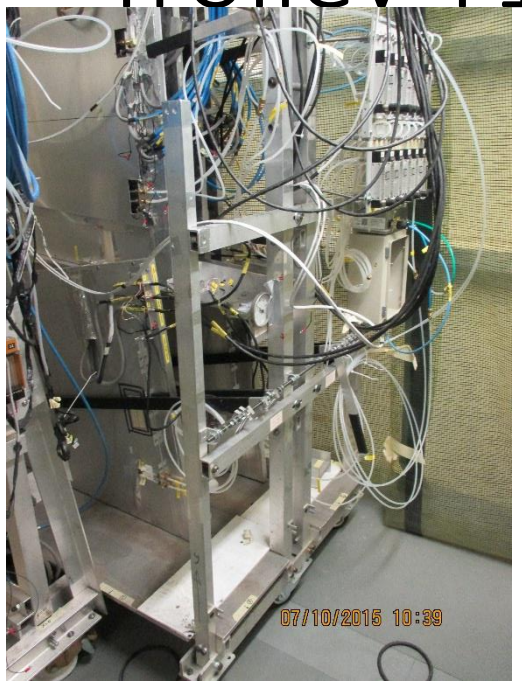
- T1 1100mm
- T0 800mm
- Glass 800mm
- MDT 1400mm
- Micromegas 500 or 600mm.

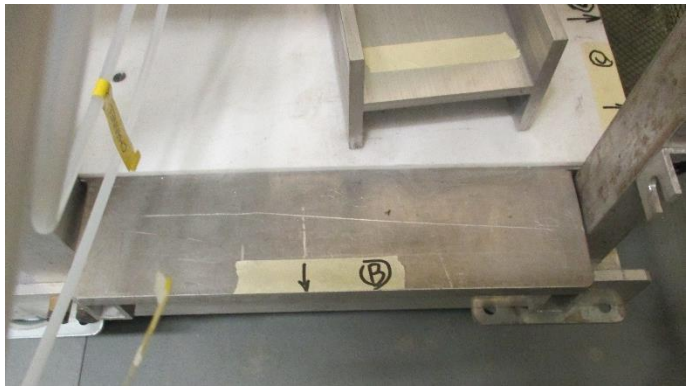
Conclusion

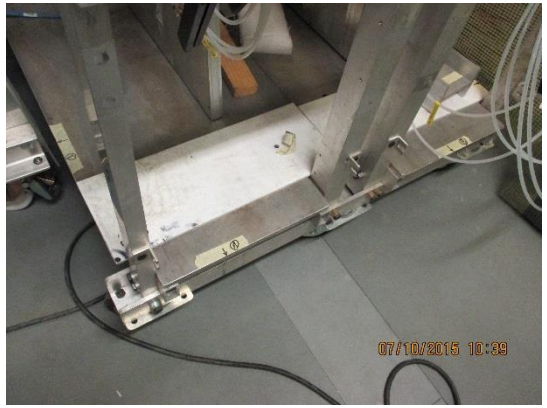
- The base diagram by Fabiola should be done to scale in mm.
- The reference points for the trolleys works well except for the Korea chambers, and others that translate in x, where their distance from the walls will be given.
- There is a mixture of the above two systems as this is the first attempt.
- The spread sheet has to be improved in clarity.
- Position of chamber structure can be defined in all 3 coordinates using the spread sheet.
- The diagram defining available space in the bunker is not yet done.
- The method to calculate the strip/eta division is not done.
- The other detectors in the bunker are not noted.
- The available space with respect to infrastructure is not done.
- This document is here; http://rpc-cms-re4-upscope.web.cern.ch/rpc-cms-re4-upscope/RPC/GIFPlusPlus/Installation/Coordinates/CoordinateSystemGIF24Sept2015.pptx.

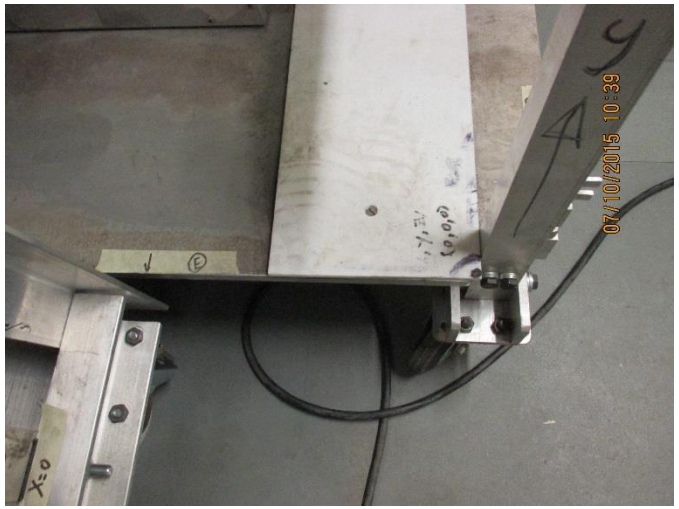
Additional material

Trolley T1 Measurements and ref points









Trolley T1 Measurements and ref points

- Saleve side