

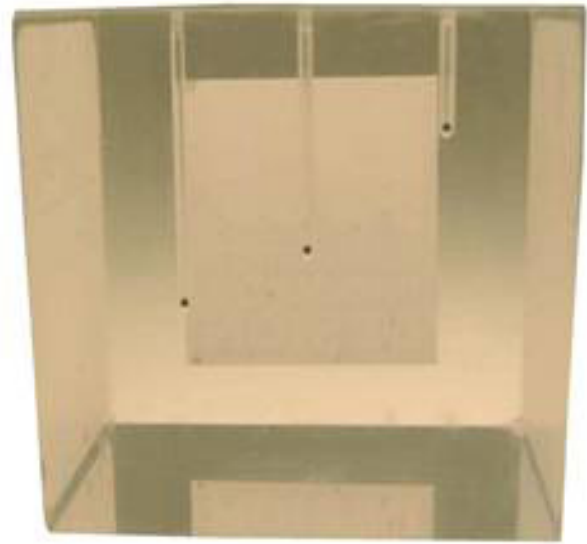
The phantom contains three 2mm sized Titanium markers.
The locations of 3 Titanium markers are as follows:

First marker at isocenter: $X;Y;Z=0$

Second marker located: $2\text{cm} -X; 2\text{cm} -Y; 2\text{cm} +Z$

Third marker located: $2\text{cm} +X; 1\text{cm} +Y; 1\text{cm} -Z$

The phantom is Size: 73mm square



The accuracy of CBCT alignment and couch shift process is of fundamental importance in the accuracy of delivered dose in Image Guided Radiation Therapy. (IGRT). This phantom can be used to test the accuracy of CBCT alignment and couch shift in a simple and efficient manner.

General Operation for Daily CBCT shift verification:

1. Place the phantom cube on CT couch
2. Align the phantom utilizing the positioning lasers on the CT machine and the laser alignment markings on the phantom. An axial CT scan of the phantom is acquired.

The reference images are imported into the TPS and a simple plan is generated where the titanium marker is aligned to the isocenter described

by the TPS. There are 2 offset titanium markers for the testing and verification of predetermined measurable couch shift

Normally one would place the phantom on the Linac couch in a known offset position from isocenter with the use of inscribed markings on the phantom. Then a CBCT scan is acquired in the offset position and the therapist aligns the phantom as one would align the patient using tools on the OBI workstation. The necessary couch shift is applied to move the phantom to the isocenter. After the couch shift is performed, the user can verify the location of the isocenter after the shift and document the deviation from the true isocenter. This test will ensure the CBCT alignment process is performing as intended within the tolerance levels established by the physicist.

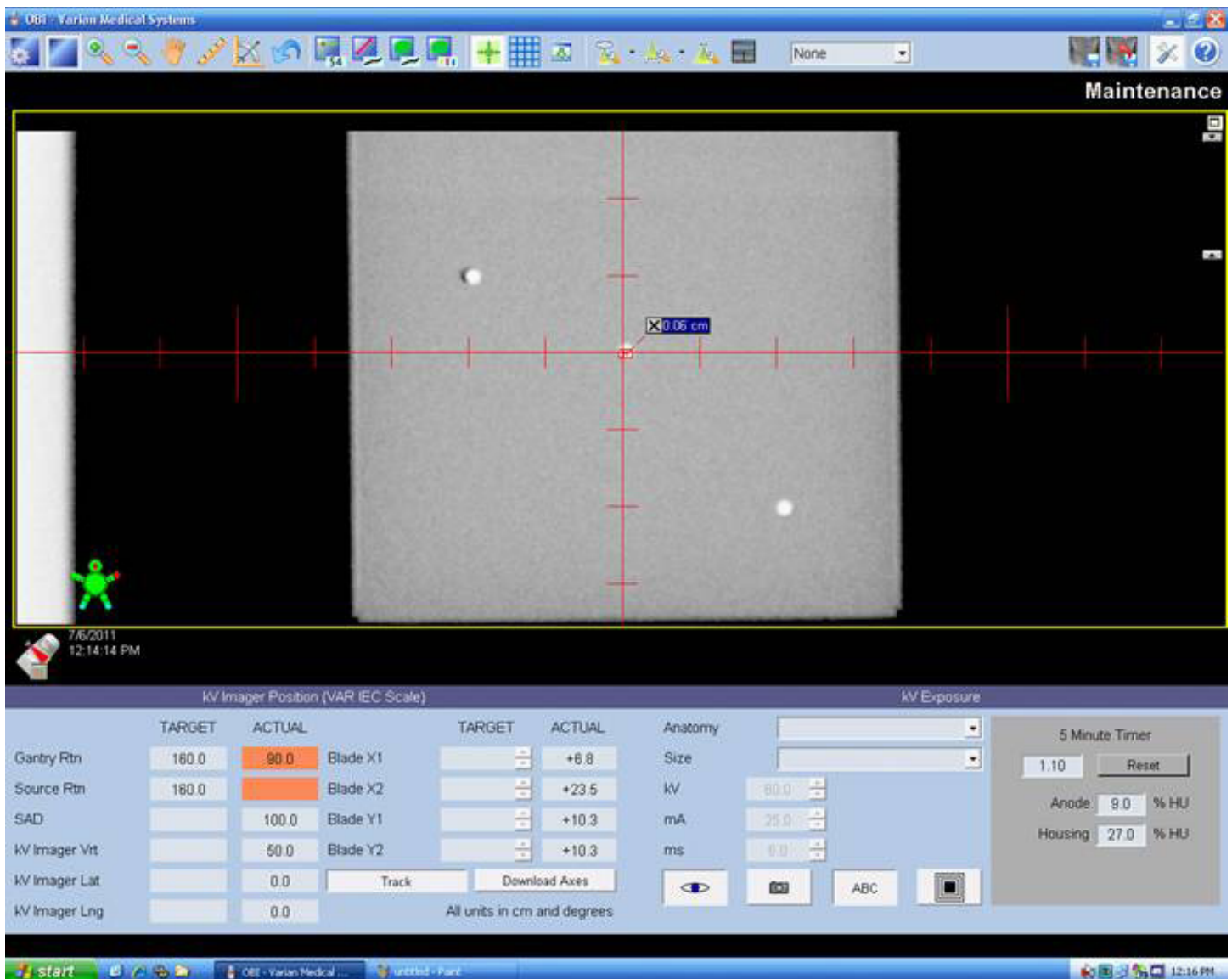
Monthly OBI Gantry Rotation and Isocenter Accuracy Test :

This phantom can also be used to quantify OBI Gantry rotation and isocenter test as part of Monthly OBI QA. Place the phantom in the isocenter position (On Titanium marker 1) with aid of Linac cross hairs. Then acquire a kv image at the four cardinal angles. Using the OBI graticule tool the displacement of the titanium marker from the graticule cross hair can be tabulated as shown in the worksheet below:

Date	OBI Gantry Rotation and Isocenter Accuracy	kV Image	Measured displacement (mm)			Limit (cm)	Results	Procedure: Position kVS at (-50,0,0). Place phantom at isocenter. Take AP, PA, RLAT, LLAT images. Measure displacement of center BB from isocenter.
			Sup-Inf	Ant-Post	Lt-Rt			
		Rt Lat			N/A	1.5		
		AP		N/A		1.5		
		LtLat			N/A	1.5		
		PA		N/A		1.5		

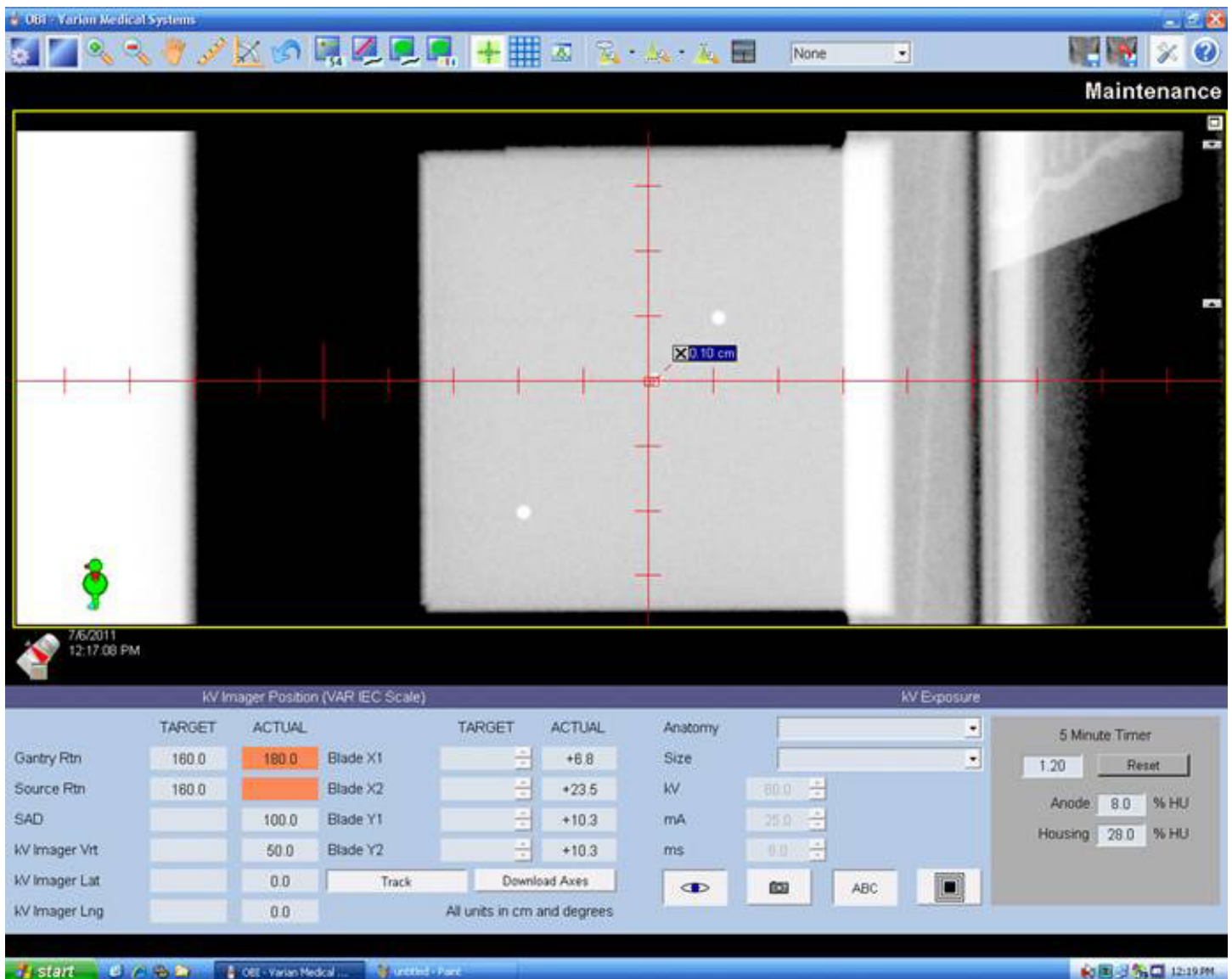
Sample images:

AP kv Image of the phantom showing 0.6 mm displacement from graticule cross hair to center of marker (isocenter)



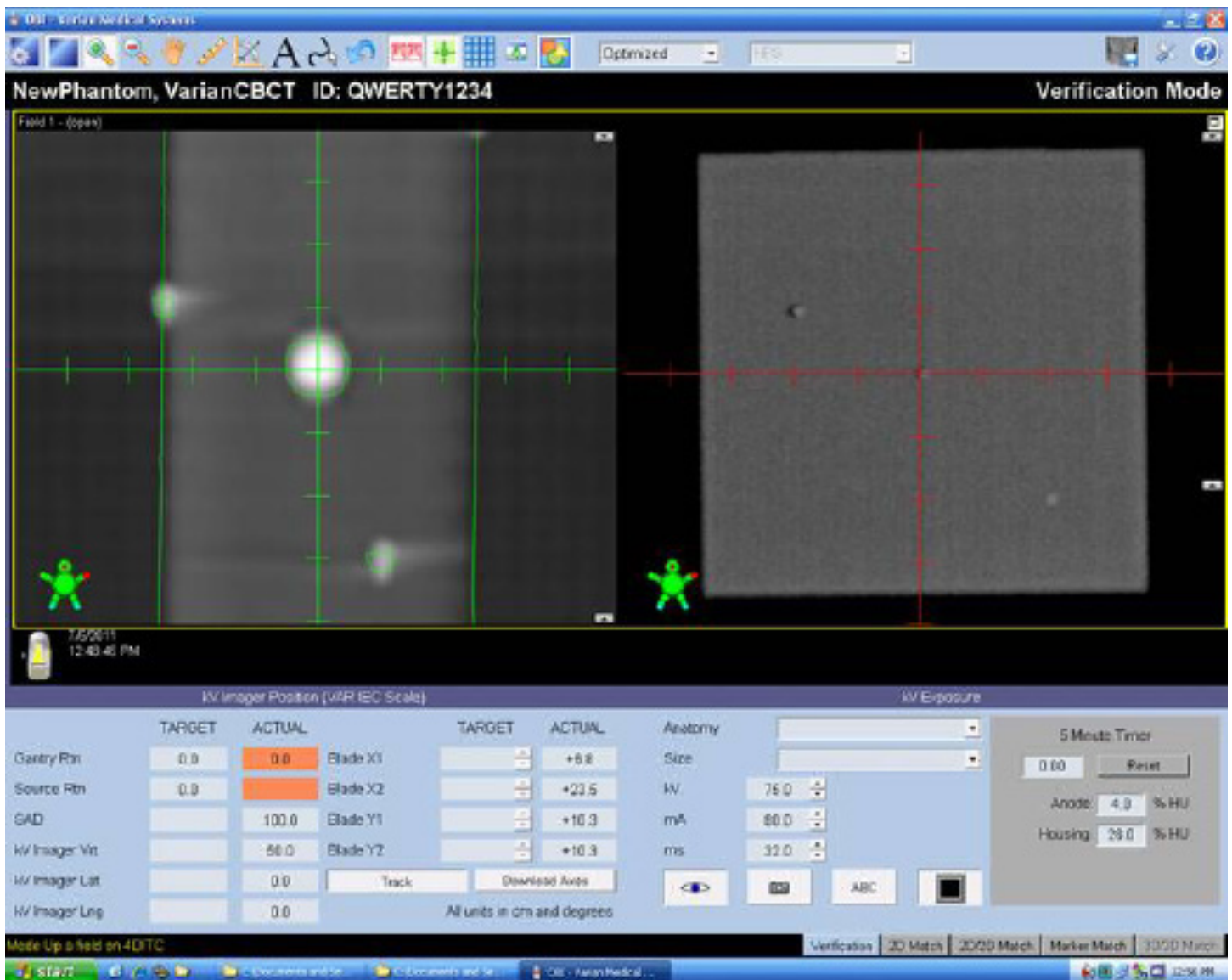
Sample Left Lateral kv image Image:

Here a displacement of 1mm is noted from the cross hair to center of phantom



Sample AP MV image from Portal imager:

In addition this process can also be applied to the MV imaging.



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