A New Generation of Quality Assurance For Radiation Oncology

Bowen Li

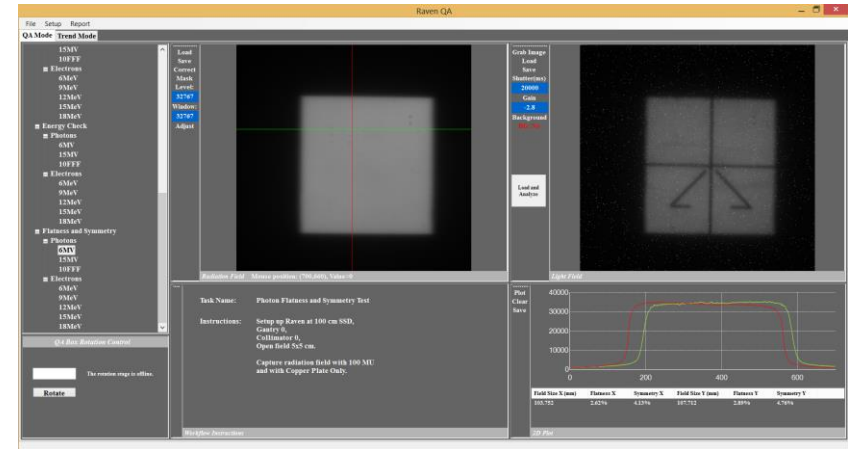under the auspices of Professor John W. Wong and Dr. Kai Ding

Goals:

- To release a commercial software for Raven QA including image acquisition, image processing, motor control and user workflow guidance.
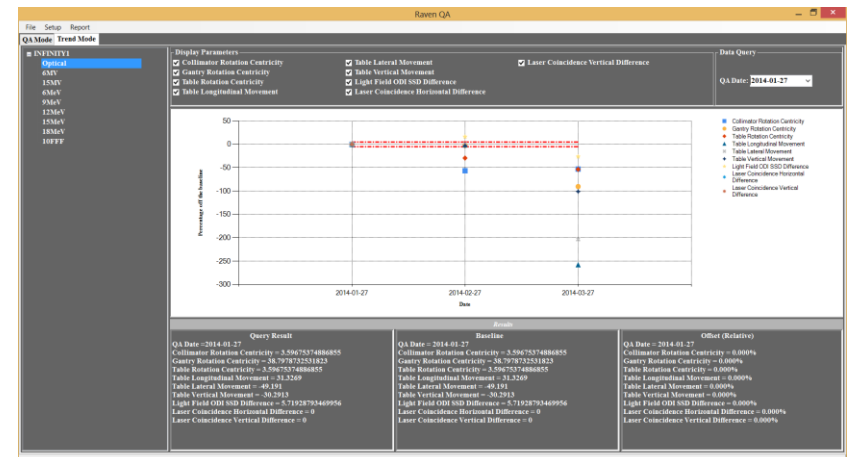
Significance:

- The software will provide a unifying QA for radiation oncology.

Results:

- Most tasks are done. Working on distortion map.

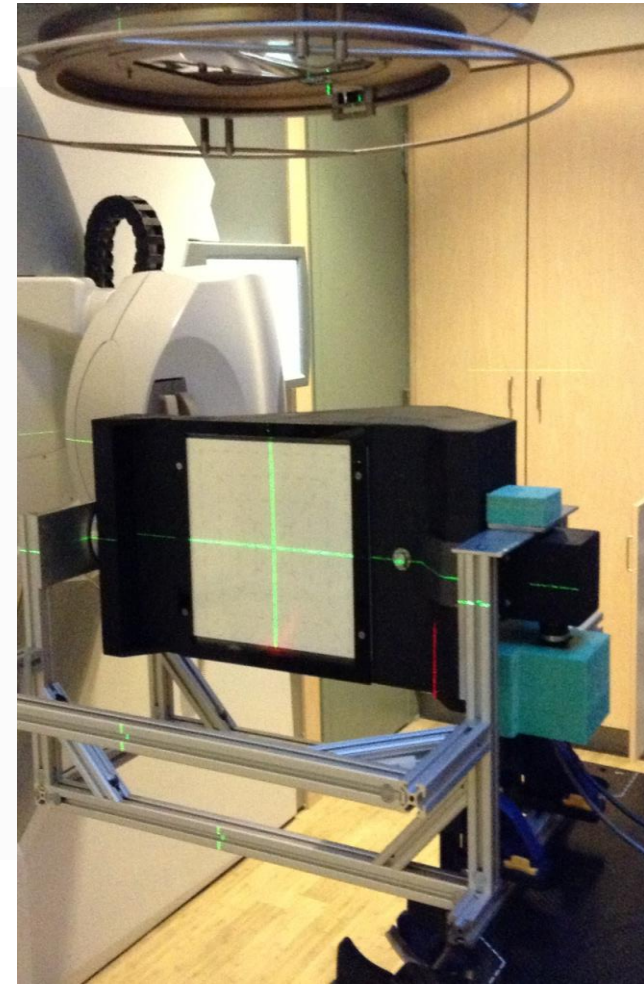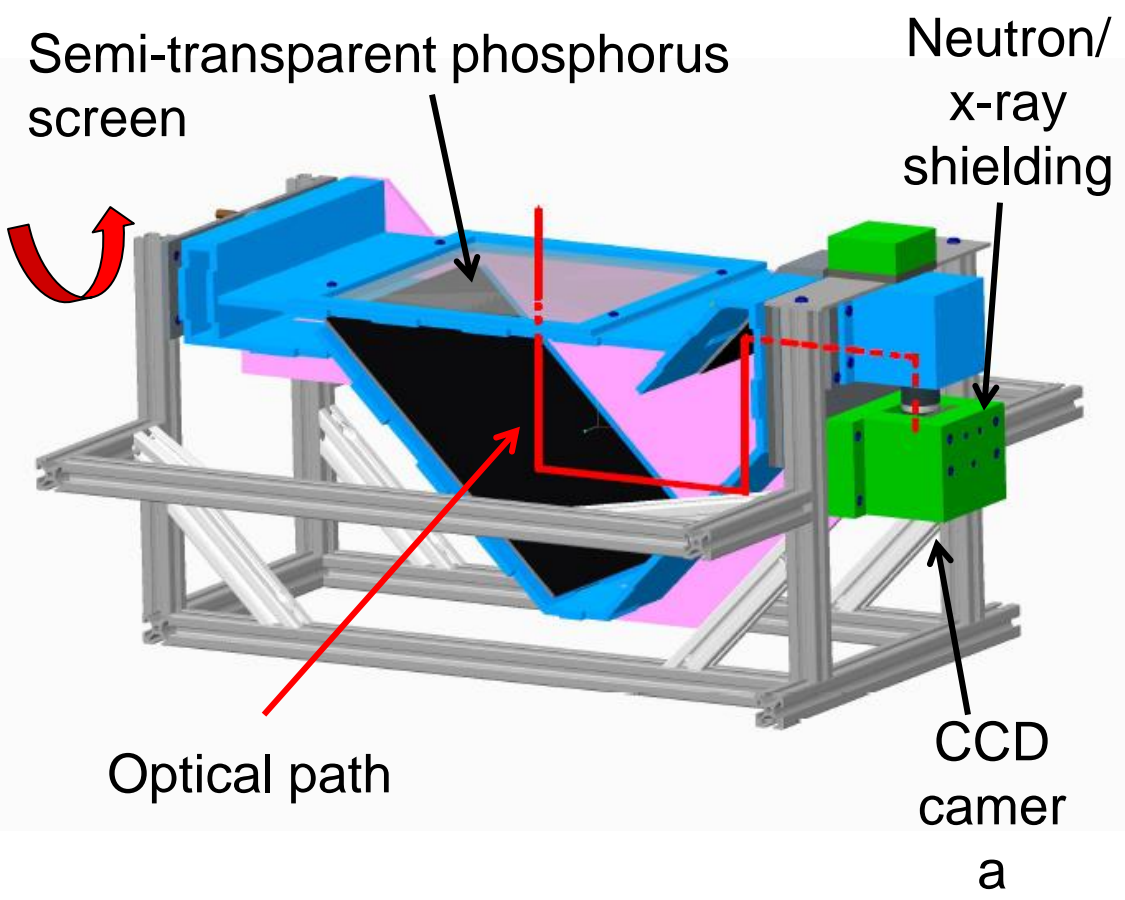- A software demo was shown in Dr. Wong's group.

- AAPM 2014 live demo.
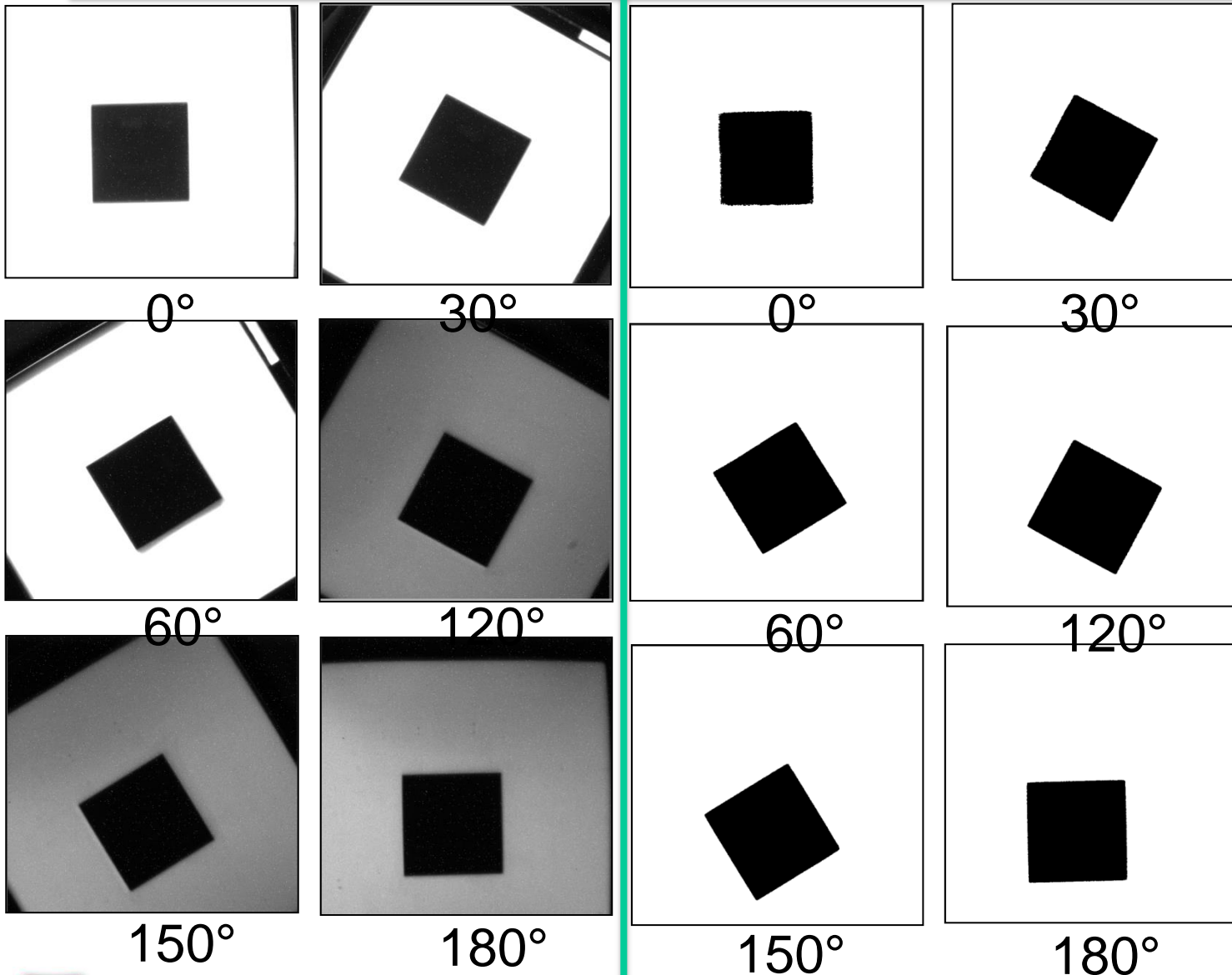

Flatness and Symmetry Test

Trend Analysis

Semi-transparent phosphorus screen

Neutron/ x-ray shielding

Optical path

CCD camera

Auto-alignment Map

0°   30°   0°   30°

60°   120°   60°   120°

150°   180°   150°   180°

Algorithm:

QA Box Rotation

Capture Images

Pre-filter

Hough Algorithm
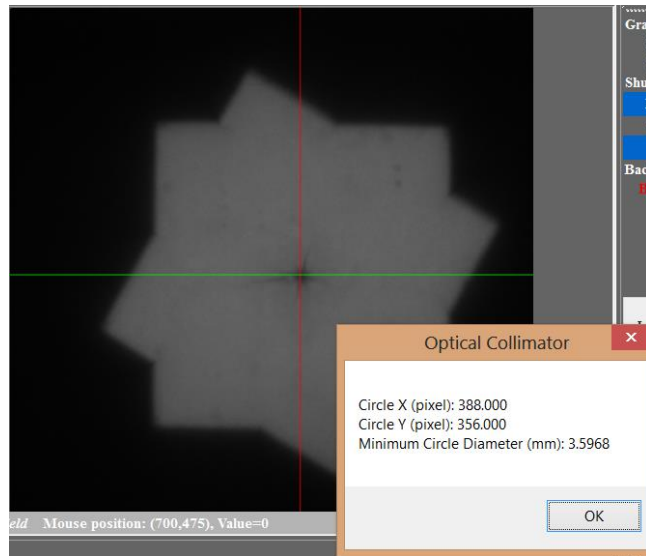
Point Cloud Regist

Time Cost:

**Monthly: 3 min
(Rough Check)**
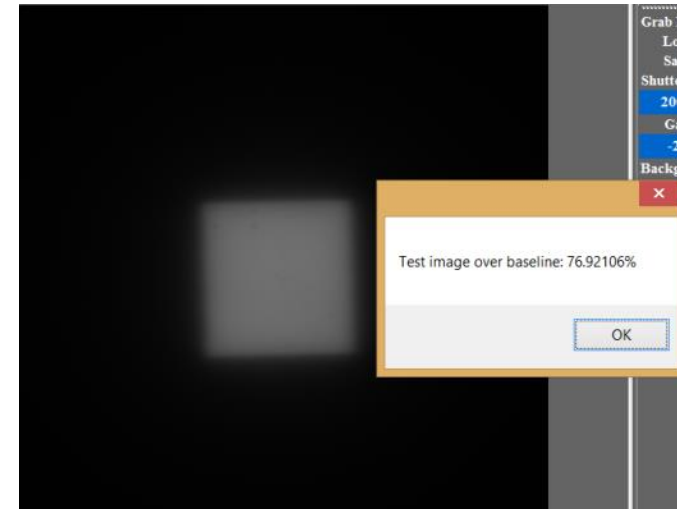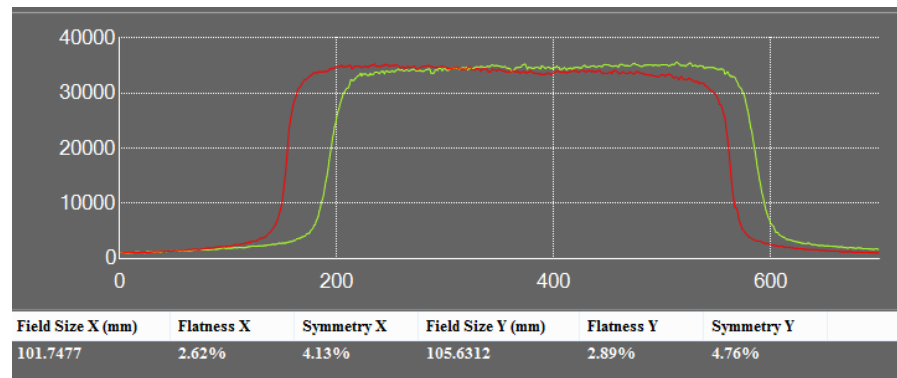
**Yearly: ~15min
(Fine Check)**

Image Processing

MLC Collimator Rotation Test

Optical Collimator

Circle X (pixel): 388.000
Circle Y (pixel): 356.000
Minimum Circle Diameter (mm): 3.5968

Energy Comparison Test

Test image over baseline: 76.92106%

Flatness and Symmetry Test

Field Size X (mm)	Flatness X	Symmetry X	Field Size Y (mm)	Flatness Y	Symmetry Y
101.7477	2.62%	4.13%	105.6312	2.89%	4.76%
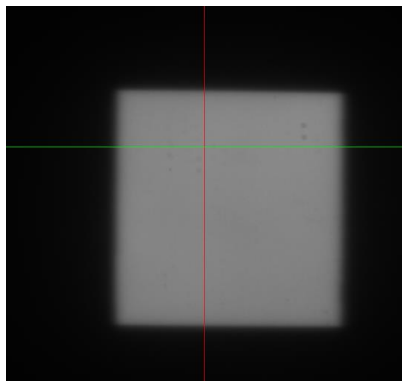
Workflow Guidance: TG-142 Standard

Engineering Research Center for Computer Integrated Surgical Systems and Technology