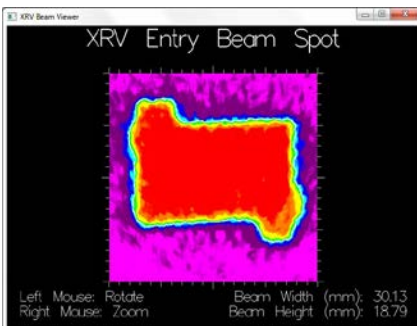


XRV-2020 X-ray Beam Profiler

X-ray and Proton Beam 2D Metrology - Logos Systems Int'l

Features and Benefits:

- **Filmless robot, collimator, and linear accelerator Quality Assurance**
- **Real-time 2D beam profile and position capture**
- **Proton beam compatible**
- **Beam diameter accuracy to .1 mm and duration timing to 50 ms**
- **Save time and reduce film costs for quick return on investment**
- **CT scanner and kV imager compatible fiducials**
- **BeamWorks software includes GUI or script operation**
- **3D beam profile viewing and measurements**
- **Advanced statistical analysis macros for export to Excel**
- **Archives all data for later review**
- **Computer, software, setup and training included**



3D Beam Profile Viewing



XRV-2020 Scintillator Camera Phantom and Calibration Plate

The XRV 2D and 3D X-ray beam inspection systems combine precision metrology with high-energy radiation detection to form a completely electronic alternative to film-based measurements. The XRV-2020 measures the XY location and profile of radiation beams with unmatched speed and accuracy. Beams up to 10x10 cm in size may be directed at the camera from user configurable orientations. Automation scripts can be used to record changes in the beam shape, intensity, and location over time.

XRV systems calibrate stereotactic radiosurgery systems or industrial radiation sources that must deliver precisely dosed amounts of radiation to targeted regions in 3D space. The correct operation of mechanical leaf collimators used in these systems can be quickly verified while the beam is active. Beam diameter measurements are accurate to .1 mm. The position of beam spot centroids are accurate to .2 mm with measurement repeatability typically being .02 mm. Beam viewing software enables real-time any-angle viewing of the captured profile data.

All operations are controlled by a laptop or desktop PC supplied with the detector. The XRV comes with a 3 to 30 meter (100 feet maximum) USB cable system so that the system PC and operator can be located safely away from the radiation source. The X-ray camera phantom weighs approximately 8 kilograms (17 pounds).



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XRV Operation

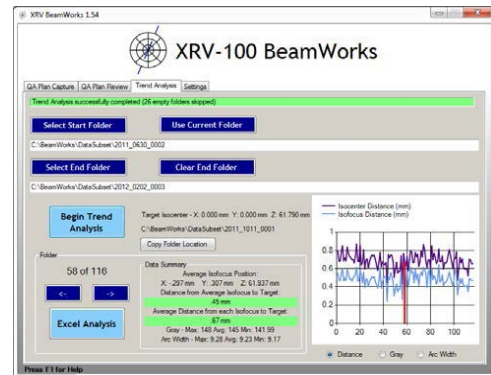
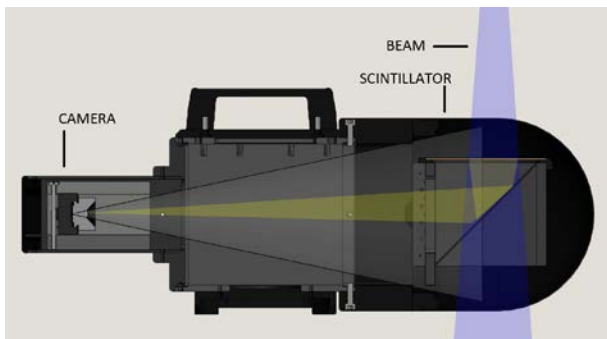
The XRV phantom may first be imaged with a CT scanner so that the fiducials can be used as a target for the treatment dose volume. Every beam of the test QA plan can then be measured for delivery accuracy. The XRV technology uses a scintillator to turn the invisible X-ray photons into a spot of visible light that faithfully represents the location and profile of the beam. A sensitive CCD camera then digitizes the beam spot and transfers the bitmap to the XRV computer for analysis and storage.

The BeamWorks software is used to acquire, analyze, and archive XRV images. Beam data is displayed in 3D allowing real-time zoom and viewing angle selection. Beam diameters can be measured at any vertical slice of the beam for easy penumbra calculations. Spreadsheet macros are provided for extended statistical analysis of the captured data. Automated measurements can be made from the graphical user interface (GUI) or customized with an easy-to-use scripting environment.

The XRV scintillator and mirror assembly can be rotated 360 degrees so that beams from any angle can be digitized, measured, and archived.



The diagram below shows how the 10x10 cm scintillator turns the X-ray or proton beam (blue) into a visible spot of light (yellow) that is reflected off the 45 degree mirror to the camera. The camera receives power via the USB cable which connects it to the personal computer. This desktop or laptop PC runs the software that captures beam images and performs measurement operations.



BeamWorks Trend Analysis

XRV-2020 Specifications:

Accuracy: ¹

XY Beam Center:	+-.2 mm
Repeatability:	+-.02 mm (typical)
Beam Diameter:	+-.1 mm
Repeatability:	+-.02 mm (typical)

Optical System: ¹

Resolution:	1280 x 960 pixels binned to 640 x 480 pixels
Capture Rate:	10-20 frames/sec (typical)
Scintillator Size:	10x10 cm
Lens MTF:	Megapixel resolution
Camera Interface:	USB

Camera Shielding: ²

Camera Top:	12.7 mm lead alloy
Camera Sides:	12.7 mm lead alloy
CCD Lifetime:	~1,500 beam hours

Camera Module Physical:

H x W x D:	26.6 x 19.1 x 58.4 cm
Weight:	7.8 kg (17.2 lbs)
Enclosure Material:	Aluminum and Plastic

Interface:

Capture Trigger:	GUI, Script, I/O or Network watch-file
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Computer Components:

Configurable to customer requirements

General:

Electrical Power:	110-220V or battery
Environment:	5 to 30 degrees C; 90% humidity, no condensation; minimal vibration

NOTES:

- Contact us for higher camera resolutions.
- Contact us for custom shielding requirements. The camera may be replaced for a service fee after approximately 3 years if necessary.

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