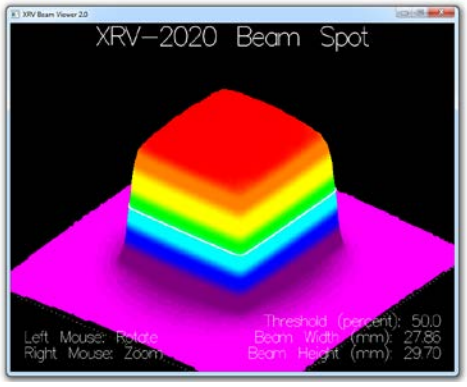
XRV-2020A X-ray Beam Profiler

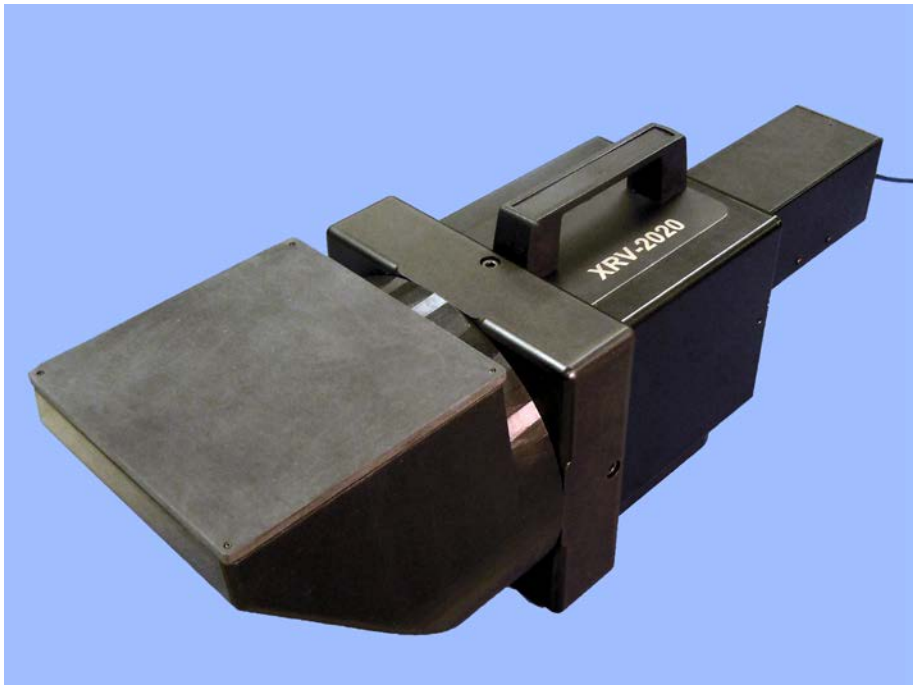
X-ray and Proton Beam 2D Metrology - Logos Systems Int'l

Features and Benefits:

- **Filmless robot, collimator, and linear accelerator Quality Assurance**
- **Real-time 145x145 mm beam profile and position capture**
- **Proton beam compatible**
- **Save time and reduce film costs**
- **Beam diameter accuracy to .3mm and duration timing to 33 ms**
- **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 and software included**



3D Beam Profile Viewing



XRV-2020A Scintillator Camera Phantom

The XRV-2020A X-ray beam profiler combines high-energy radiation detection with precision two dimensional metrology to form a completely electronic alternative to film-based measurements. The XRV-2020A measures the XY location and profile of radiation beams with unmatched speed and accuracy. Beams up to 14x14 cm in size may be directed at the scintillator surface from vertical and horizontal 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 dimension measurements are accurate to +-0.15 mm and centroid positions to +-0.2 mm. Beam viewing software enables real-time any-angle viewing of the captured profile data with live penumbra and symmetry measurements.

All operations are controlled by a laptop or desktop PC supplied with the camera phantom. The XRV comes with a 30 meter (100 feet) 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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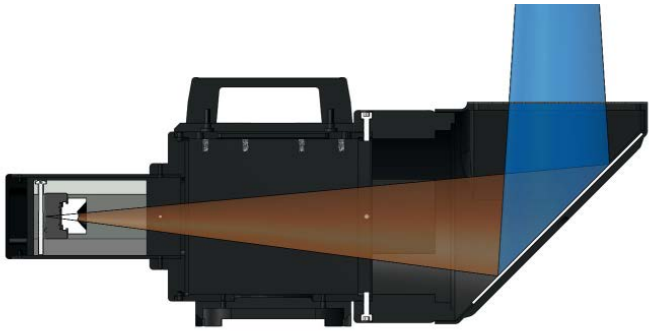
XRV Operation

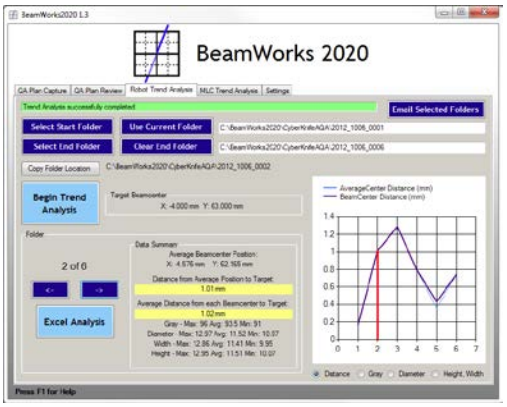
The XRV phantom may first be imaged with a CT scanner so that the fiducials can be used as a target for the treatment dose volume. Every beam of the test QA plan can then be measured for delivery accuracy. The XRV technology uses a scintillator to turn the invisible X-ray photons into a spot of visible light that accurately 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 height, width, penumbra and symmetry measurements are available from any angle of beam rotation. 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 145x145 mm 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 calibration plate shown below is used by the software to convert camera pixels into accurate millimeter distances.



BeamWorks 2020 Trend Analysis

XRV-2020A Specifications:

Accuracy: [1]

XY Beam Center:	+-.2 mm
Repeatability:	+-.04 mm (typical)
Beam Diameter:	+-.15 mm
Repeatability:	+-.04 mm (typical)

Optical System: [1]

Resolution:	1280 x 960 pixels binned to 640 x 480 pixels
Capture Rate:	10-30 frames/sec (typical)
Scintillator Size:	145x145 mm
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

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:
1. Contact us for higher camera resolutions.
2. 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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