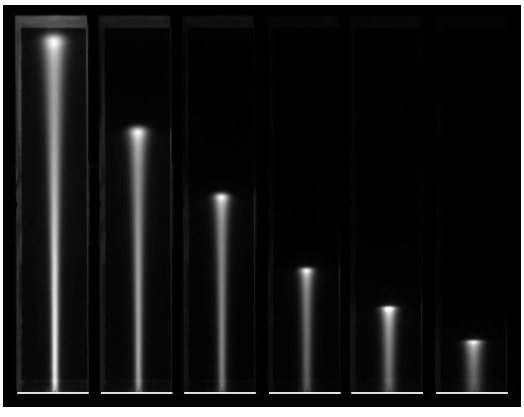
Ranger-300 Proton Energy Verification

Proton and X-Ray Beam Metrology — Logos Systems Int'l

Features and Benefits:

- **Fast Bragg peak measurement of proton and heavy ion beams up to 30 mm in diameter**
- **50 – 225 MeV proton beam standard range**
- **70 – 235 MeV proton beam range with acrylic range shifter**
- **75 – 244 MeV proton beam range with PTFE range shifter**
- **Accuracy better than 0.5 mm**
- **Mounting options available for the XRV-3000 Eagle and XRV-4000 Hawk**
- **Easy handling for use at all gantry angles**
- **BraggPeakView software for image analysis and measurement**
- **Excel analysis template provided**



Proton beam Bragg peak images

Ranger-300 mounted on the XRV-4000 Hawk Phantom

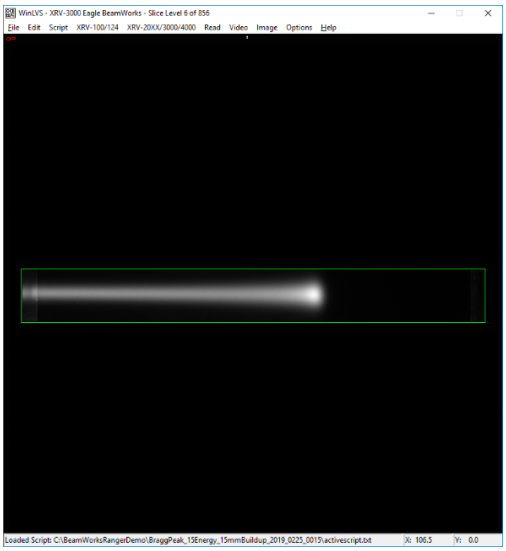
The Ranger-300 is a module that mounts onto the XRV-3000 Eagle or XRV-4000 Hawk for the purpose of imaging the Bragg peak of proton and heavy ion beams. The Ranger is oriented such that the hadron beam enters the end of a plastic scintillator block that is approximately 305 mm long and has a water equivalent thickness of approximately 1.04. As the ions slow down, light is generated and the beam image is reflected off the phantom mirror to the USB camera. The entire path of the beam from the scintillator entry point through the Bragg peak region is captured by the camera at a resolution of approximately 0.3 mm per pixel. The resolution of the camera in that orientation is 1200 pixels.

The entry of the Ranger-300 is a 1.6 mm thick opaque window of acrylic (PMMA) upon which additional blocks of range shifting material may be added and held in place via thumbscrews. The standard water equivalent range of 320 mm can be extended to 350 mm with the included 25 mm acrylic (PMMA) insert. The optional 25 mm PTFE insert extends the water equivalent range to 360 mm. More energetic beams can be measured with custom inserts of either longer dimensions and/or denser composition.

The 55 mm width and height of the plastic scintillator allows images of beams up to 30 mm in diameter to be captured and measured by the Eagle or Hawk. Existing owners of the XRV-3000 and 4000 will receive a software upgrade in order to handle the Ranger-300 imaging and measurement requirements. Please contact us for custom configurations of the Ranger-300 design.

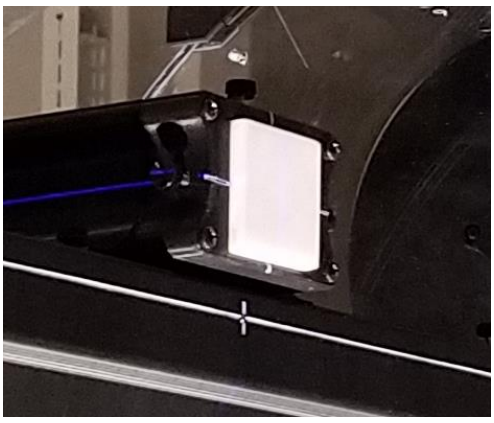
Logos Systems Int'l 175 El Pueblo Road, Scotts Valley, CA 95066
Ph: 831.600.6101 Fax: 831.439.9440 sales@logosvisionsystem.com www.logosvisionsystem.com

The WinLVS software supplied with the Eagle and Hawk interfaces to the CCD camera in the phantom and is responsible for capturing images at rates from 1 to 15 frames per second under script or user-interface control. The BraggPeakView measurement software accesses WinLVS several times per second, transferring the integrated proton path and Bragg peak region profile into its chart and local memory.

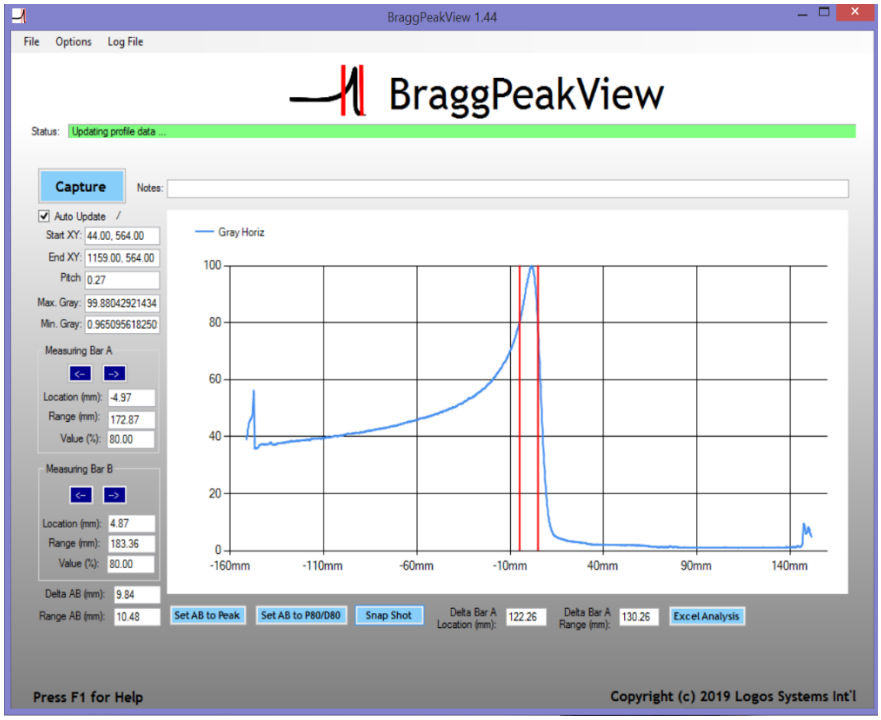


WinLVS captures Bragg peak image sequences up to 15 FPS

The BraggPeakView software displays the WinLVS captured image in a variety of formats including options that convert the quenched scintillator image profile into a pristine Bragg peak curve. A variety of buttons and controls can be used to manually or automatically measure proximal and distal features on the Bragg peak curve.



40x40 mm beam window with 25 mm deep PTFE buildup



BraggPeakView software with measuring bars at P80 and D80

Ranger-300 Specifications:

Accuracy:
Repeatability: +-0.1 mm (typical)

Compatible Optical Systems:
XRV-3000 Eagle: 0.5 mm R100
XRV-4000 Hawk: 0.5 mm R100

Scintillator Dimensions:
H x W x D: 55 x 55 x 305 mm
Target Window: 40 x 40 mm

Scintillator Properties:
Nominal Density: 1.023 g/cc
Refractive Index: 1.58

Buildup Options and nominal WET values:
Acrylic: 1.17
PTFE/Teflon: 1.85
Plastic Water: 1.0

Weight:
XRV-3000 Option: 2.0 kg
XRV-4000 Option: 2.1 kg

Required Software:
BeamWorks Strata V3.7
WinLVS V9.99
BraggPeakView V1.45

Contact us for wider format scintillator options

9/6/2019

Logos Systems Int'l 175 El Pueblo Road, Scotts Valley, CA 95066
Ph: 831.600.6101 Fax: 831.439.9440 sales@logosvisionsystem.com www.logosvisionsystem.com