



IVIS® Imaging System 200 Series



IVIS® Imaging System 200 Series includes the XGI-8 Gas Anesthesia System and an XWS-260 or XWS-248 Workstation.



A fully integrated design offers superior optics, both bioluminescent and fluorescent imaging, spectral imaging, and a laser scanner for single-view 3D reconstruction.

IVIS® Imaging R&D Applications

- Tracking and monitoring
- High-quality data on treatment efficacy
- Genomics, pharmaceutical, and biotechnology R&D
- Drug metabolism and toxicological screening for pharmaceuticals and chemical manufacturers

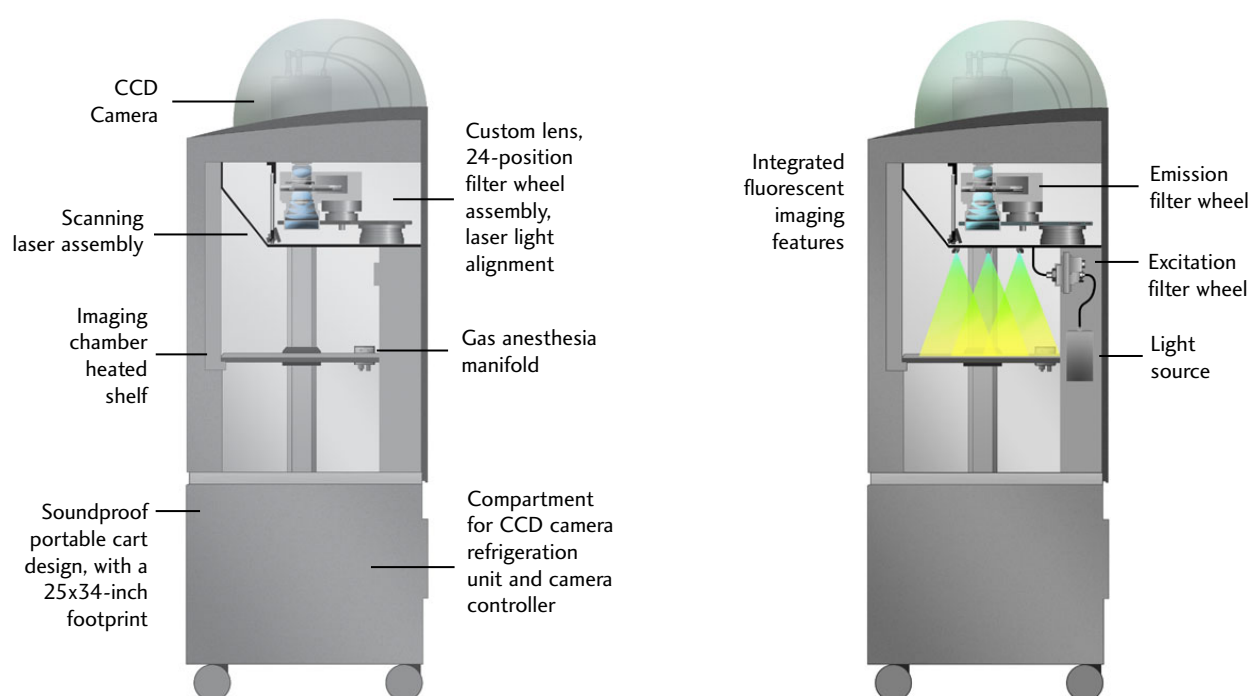
The IVIS® Imaging System 200 Series is Xenogen's first fully integrated system, combining all imaging components into a 25x34-inch portable footprint. The system uses a novel Xenogen technology—*in vivo* biophotonic imaging—to allow researchers to use real-time imaging to monitor and record cellular and genetic activity within a living organism.

New features on the IVIS® Imaging System 200 Series include a custom lens with 5-position carousel and adjustable field of view of 4–26 cm, more uniform

light collection, and improved resolution with single cell sensitivity for *in vitro* use. An integrated fluorescence system (400–900 nm) allows easy switching between fluorescent and bioluminescent spectral imaging applications, while a laser scanner provides 3D surface topography for single-view diffuse tomographic reconstructions of internal sources. A 26 mm square back-thinned CCD, cryogenically cooled to -105°C (without liquid nitrogen), minimizes electronic background, and maximizes sensitivity.

Integrated Imaging Features

The IVIS® Imaging System 200 Series is the latest advancement in improving quantitative outcomes of *in vivo* imaging of bioluminescent reporters. A single-view imaging system designed for high throughput, the IVIS® 200 Series' instrumentation and software allow researchers to better account for the effects of photon absorption and scattering in tissue, making bioluminescent source measurements more quantitative.



IVIS® Imaging System 200 Series incorporates Xenogen standards for effective and humane animal handling, including an anesthesia manifold and heated animal shelf (up to 40° C) to help stabilize animal physiology and minimize testing variables.

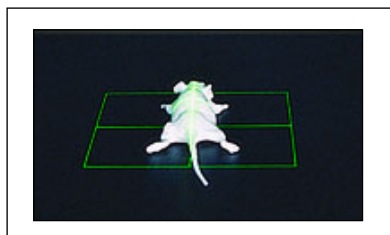
Bioluminescent and Fluorescent Imaging

Researchers can use this single system to perform quantitative *in vitro* and *in vivo* assays using reporter cells tagged with both bioluminescence and fluorescence. The instrument includes dual 12-position emission filter wheels (24-position total) and a 12-position excitation wheel. A set of four filters pairs come standard with the instrument, in addition to a set

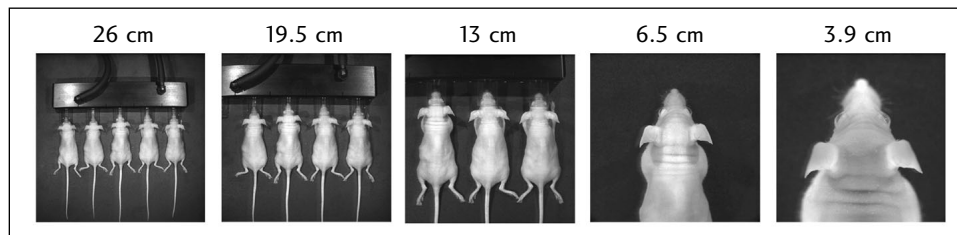
of four background filters for subtraction of tissue autofluorescence.

Alignment Grid

To ensure consistent accurate placement of animals for imaging, the system uses a green laser (532 nm) and magnetically actuated scanning mirrors to project an alignment grid up to 25 x 25 cm onto the imaging platform.



Alignment Grid: Grids up to 25 x 25 cm are projected onto the imaging platform with the scanning laser assembly.



Five Field of View Options: The turret-mounted custom lens provides five levels of magnification up to a 26 cm field of view for five mice per image session.

Five Field of View Options

A new, turret-mounted custom lens provides five levels of magnification and achieves uniform light collection at f/1 with high resolution over the entire field of view. High throughput applications will benefit from the large 26 cm field of view, which can image up to five mice at a time. For more detailed work, the small 3.9 cm field of view is well suited for high-resolution (60 μ m) imaging.

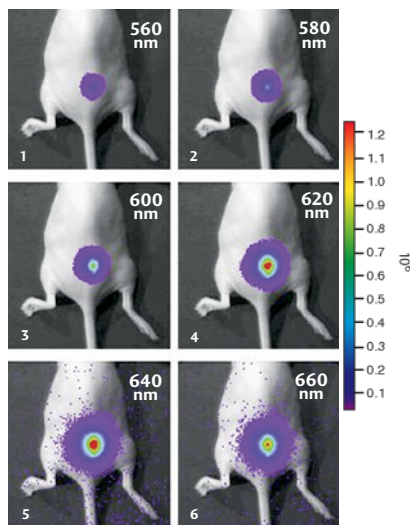
Spectral Imaging

Spectral imaging uses measurement data from a sequence of images filtered at different wavelengths, ranging from 560 nm to 660 nm, to determine the depth and location of a bioluminescent reporter. Because absorption is wavelength dependent, tissue depth affects the emission spectrum. The filters can also be used to distinguish reporters with different wavelengths. The computer-controlled, 24-filter capacity

filter wheels significantly expand the research opportunities of both bioluminescent and fluorescent imaging.

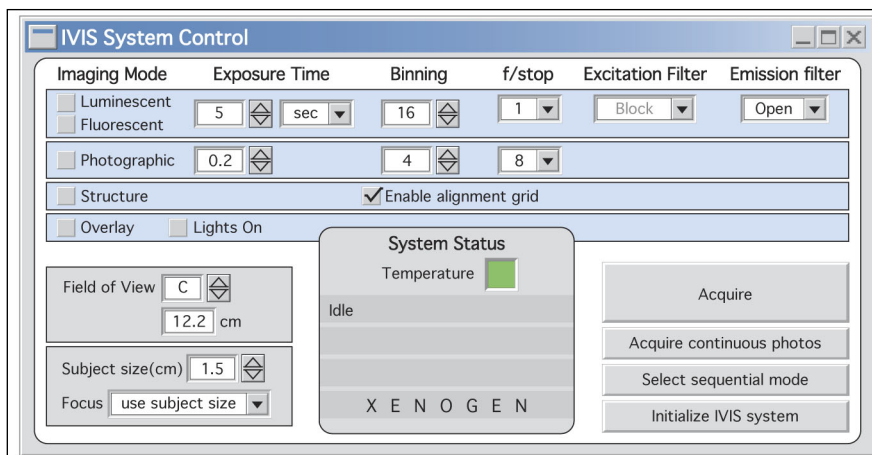
Living Image® Software 2.50 Advances Imaging Technologies

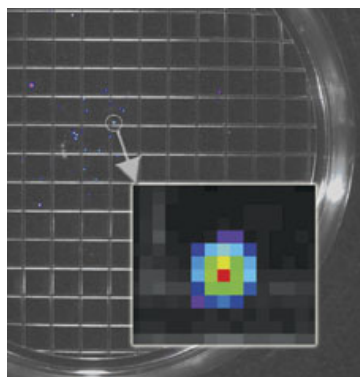
Living Image® Software Version 2.50 is the most advanced imaging acquisition, and analysis tool software yet from Xenogen. Living Image® software can be fully utilized with the new IVIS® Imaging System 200 Series and is compatible with existing IVIS® Imaging System 100 Series and IVIS® Imaging System 50 Series technology. Data analysis versions of Living Image® 2.50 software run on both Windows® and Macintosh® platforms and provide powerful new features such as automatic Region of Interest (ROI) creation and background subtraction tools. The result is easy to use high throughput and accurate quantitative data measurements.



Spectral Imaging: Filtering images at different wavelengths ranging from 560 nm to 660 nm, Living Image® Software 2.50 determines the depth and location of bioluminescent reporters. This technique quantifies depth data of a bioluminescent reporter and its absolute light intensity, as opposed to relative intensity measured at an animal's surface.

Living Image® Software Version 2.50: Application enhancements include computer-controlled sequential imaging, which simplifies and accelerates the collection of spectral data, and kinetic sequences.





The IVIS® Imaging System 200 Series offers a high degree of light sensitivity, enough to detect and quantify the light emission from a single cell. A Xenogen PC-3M-luc Bioware® cell line shown above is one of approximately 40 PC-3M-luc prostate tumor cells imaged in a 3.5 cm dish using the 1.5x demagnification lens, resulting in a 60µm resolution at f/1.

Standard filter sets for IVIS® Imaging System 200 Series. (Custom filters are available on special order):

Fluorescence Filters

Set	Name	Excitation (nm)	Emission (nm)	Background (nm)
1	GFP	445–490	515–575	410–440
2	DsRed	500–550	575–650	460–490
3	Cy5.5	615–665	695–770	580–610
4	ICG	710–760	810–875	665–695

Spectral Imaging Filters

5	560 nm	550–570
6	580 nm	570–590
7	600 nm	590–610
8	620 nm	610–630
9	640 nm	630–650
10	660 nm	650–670

Contact Information

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Surface Topography Features

3D Surface Topography Reconstruction

A computer-controlled scanning laser is used to project lines of light onto an animal subject. The lines deflect as they pass over and give a measure of the surface height everywhere on the subject. By imaging these lines with the CCD camera, and processing the image with Living Image® software, the surface topography of the animal is determined. This surface information is required for

performing 3D diffuse tomography reconstructions.

Single-view Diffuse Tomography

Diffuse tomography algorithms under development can be used with the IVIS® Imaging System 200 Series to reconstruct the location and brightness of bioluminescent sources inside the mouse. This algorithm utilizes single-view surface topography and luminescent image data. Expected accuracy is on the order of 1–3 mm.

Component Specifications

Imaging Components	Specifications
Sensor	Back-thinned, back-illuminated Grade 1 CCD
CCD Operating Temperature	Nominal –105° C
Imaging Pixels	2048 x 2048
Minimum Resolution	60 µm (at f/1)
Pixel Size	>13.5 µm square
CCD Size	26 x 26 mm
Quantum Efficiency	>85% 500–700 nm; >50% 350-950 nm
Read Noise	<5 electrons RMS
Dark Current	<100 electrons/s/cm ²
Minimum Detectable Radiance	<70 photons/s/sr/cm ²
Lens	f/1–f/8, 1.5x, 2.5x, 5x, 7.5x, 10x magnifications
Fields of View	3.9 x 3.9 cm to 26 x 26 cm (3.9, 6.5, 13, 19.5, 26 cm)
Scanning Laser	<1 mW power at 532 nm
Stage temperature	Ambient to 40° C
Imaging Chamber Dimensions	51 cm x 51 cm x 66 cm (D x W x H)
Weight	<275 kg/600 lb
Noise	55 dB < 500Hz
Power Requirements	20 Amps for 120VAC or 10 Amps for 230VAC
Fluorescence Imaging Components	Specifications
Excitation Filter	25 mm diameter 12-position (11-filter capacity)
Emission Filter	60 mm diameter 24-position (22-filter capacity)
Background (autofluorescence and leakage)	<3 part in 10 ⁶ typical
Lamp	150 W Quartz halogen 3250° Kelvin
Fluorescence Field of View	6.5, 13, 19.5, 26 cm (fluorescence not available at 3.9 cm field of view)
System Features: Heated stage up to 40° C; Gas anesthesia inlet and outlet ports; scanning laser for alignment and surface topography; High-performance acquisition computer; 20-inch, high-resolution flat screen monitor; Software-controlled focus, f-stop, field of view; Excitation/Emission filter wheel; Xenogen's Living Image® software provides image acquisition controls and image analysis.	