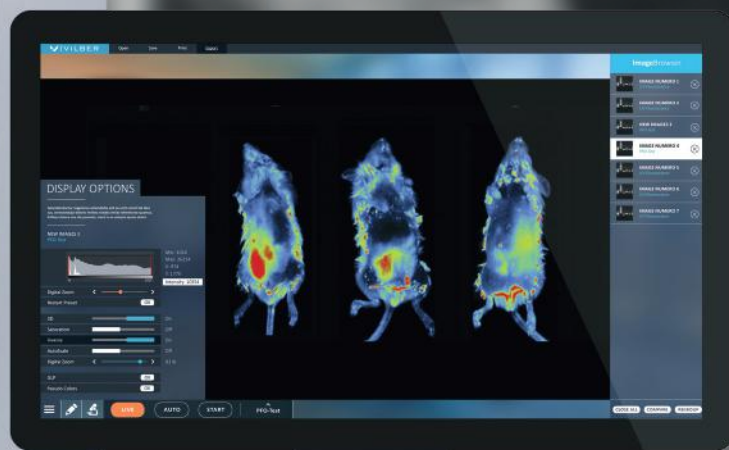


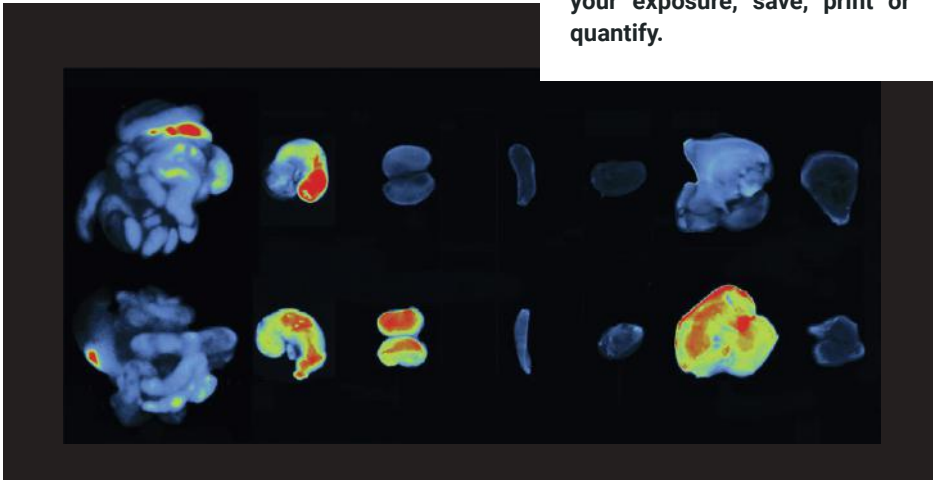
# NEWTON 7.0

BIOLUMINESCENCE &  
FLUORESCENCE IMAGING

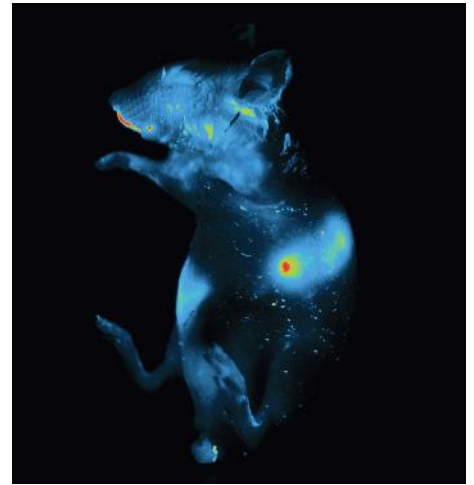


IN VIVO - IN VITRO IMAGING

The NEWTON's protocol driven image acquisition is as quick as it is intuitive: adjust your exposure, save, print or quantify.



Dox distribution - Ex vivo fluorescence imaging of organs at 10 h post-oral-administration



Tumoral cells expressing luciferase, 6 weeks after injection

# Newton 7.0 FT-400

## APPLICATIONS

The NEWTON 7.0 is a highly sensitive optical imaging system dedicated to the visualization of in vivo, in vitro and ex vivo applications. Various bioluminescent reporters like firefly luciferase and many fluorescent molecular reagents can be used to visualize and track tumor, disease or inflammation development, target molecules to nanoparticles or follow biodistribution and pharmacokinetics studies within living animals in a non-invasive manner.

## BIOLUMINESCENCE

The NEWTON 7.0 proprietary optics have been specifically developed for macro imaging with high light collection capacity, incorporating a unique combination of high numerical aperture and long working distance.

The NEWTON 7.0 custom made V.070 lens combines sensitivity and optical performance for very faint light conditions. The optical system includes ultra-low dispersion components to enhance the sensitivity, and aspheric elements to deliver consistently sharp images. The main function of a camera lens is to collect light. The lens aperture represents its capability to collect as much light as possible in a given period. Its sensitivity is usually expressed by a range of f-stops. The smaller the f-stop number, the larger the aperture. A lower f-number denotes a greater aperture opening, which allows more light to reach the CCD sensor. The aperture of the V.070 lens is f/0.70, providing faster imaging and better sensitivity compared to all other imagers.

## FLUORESCENCE

The advent of novel fluorescent probes has increased the demands on in-vivo fluorescence imaging systems to be able to deftly handle a variety of simultaneous signals. The best spectral range for penetrating an animal is between 600 nm and 900 nm. With NIR fluorescence detection, background is very low, and tissue autofluorescence does not limit performance.

The NEWTON 7.0 offers 8 excitation channels in the visible RGB and NIR spectrums. Each individual light source delivers a precisely defined range of the spectrum. The very tight LED spectrum is additionally constrained with a very narrow excitation filter. This means less background in the images of your sample and a higher signal to noise ratio to detect the weakest signals.

Bright fluorescence observation can be performed in a rapid scanning mode that shortens exposure times and minimizes specimen damage. The scientific LED beam scans the entire imaging bed surface to provide an unrivalled light homogeneity for a more accurate signal quantification, delivering a precise and traceable quantity of energy for 100% reproducibility of an experiment.

Signals can be overlaid so that up to 4 reporters can be visualized simultaneously for multispectral imaging applications. Crosstalk issues are then overcome using Spectral Unmixing function that separates the different signals, so that each channel contains only the signal from one reporter.

A large number of probes and stains can be used such as GFP, RFP, FITC, mCherry, DAPI, Alexa Fluor® 680, 700, 750, Cy® 3, 5, 5.5, DyeLight, IRDye® 800CW, VivoTrack 680, VivoTag 750...

The NEWTON 7.0 is calibrated according to NIST standards. The calibration is based on the use of a NIST traceable luminometer reference source that allows the reading comparison to the NIST established baseline. The system's performance can then be tested periodically with confidence.

## 3D OPTICAL TOMOGRAPHY

Bioluminescence Tomography (BLT) as well as Fluorescence Molecular Tomography (FMT) are imaging techniques providing further quantitative and localized analyses of a source distribution within a living animal from signals measured on the body surface of the animal.

The NEWTON 7.0 integrates an innovative 3D Tomography imaging module that reconstructs bioluminescent or fluorescent signals into volume that are overlaid within the 3D topographic model of the subject.

For a better understanding of anatomical and deeper tissue structures, the digital organ library allows the superimposition of the mouse organs to the tomographic image to identify the source localization with precision.



# NEWTON 7.0



## SUPERIOR QUANTITATIVE RESULTS

Ultimate linearity for precise protein quantification over the full dynamic range.



## MULTISPECTRAL IMAGING

Ultra-low noise imaging thanks to a dual camera amplifier architecture.



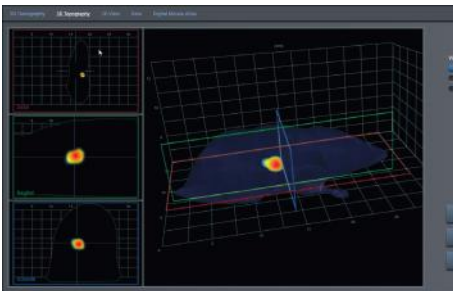
## CUSTOM MADE V.070 LENS

Newton custom made lens for enhanced sensitivity and sharpness.

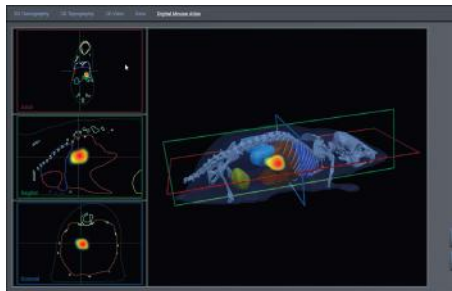


## NARROW BANDPASS FILTERS

Time to get the image is drastically reduced and precious antibody can be saved.



3D BLT imaging



Digital mouse organs co-registration



Bioesthesia station

## USER FRIENDLINESS

The NEWTON's protocol driven image acquisition is as quick as it is intuitive. Easily position the animals using the sliding-out imaging bed, select your protocol and click on start. The camera is motorized on the Z-axis to go from a large field of view to a macro imaging with ease of use. The imaging bed is by default thermoregulated to +37°C and its temperature can be controlled from 20°C to 40°C, or even switched off for ex vivo or in vitro applications. It is also motorized on X/Y-axis and is detachable should you need to do preparative work on the bench before the imaging process.

## ANIMAL MANAGEMENT

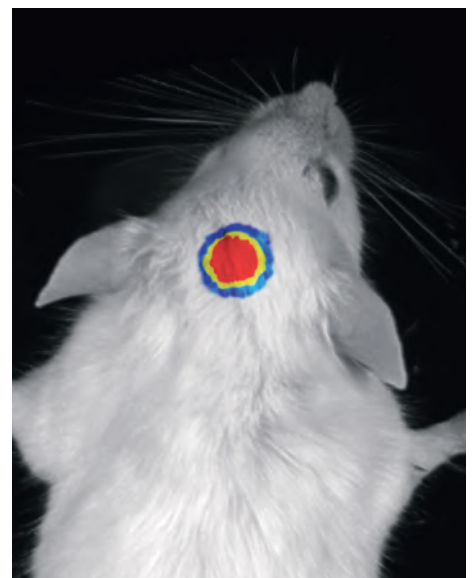
The BIOSTHESIA system has been specially designed for inhalation of isoflurane agents by laboratory animals. The BIOSTHESIA is a small weight device, compact and robust, which can be used as a standalone unit on a

table. As it is transportable, it can be moved from one place to another in no time and can be immediately operational.

The system is composed of a medical grade digital flowmeter, a precision TEC3 format vaporizer, an active charcoal filter, a breathing circuit with mouse nosecone/mask and an induction box.

The BIOSTHESIA vaporizer is designed to operate with isoflurane and is calibrated using a laser refractometer, to ensure accuracy of use. In addition, our vaporizer has a safety lock function, to prevent accidental turn on making the BIOSTHESIA vaporizer not only one of the most accurately manufactured and certified vaporizer, but one of the safest.

An isolation chamber sealed with HEPA-SPF filters can be supplied for the transportation and the imaging of immunocompromised animals, so that pathogens cannot get inside or outside the box.



## Imaging Versatility

- Visualization and tracking of tumor development or disease progression in the living animal
- Signals overlay so that several reporters can be visualized simultaneously
- In vitro and in vivo cells migration tracking
- Signal quantification

# NEWTON 7.0

## Performance

- Proprietary V.070 lens with f0.70 aperture
- 1" scientific grade CCD camera
- Bioluminescence detection
- Fluorescence detection
- 3D Optical Tomography



## Ease Of Use

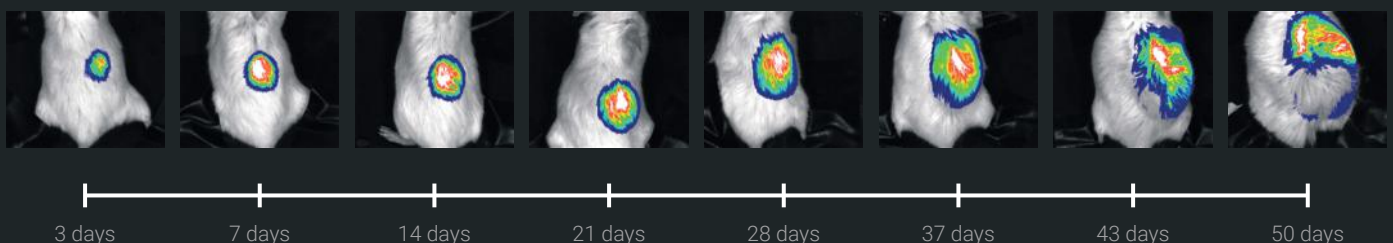
- Intuitive user interface
- One click to get the image
- Auto-exposure and automatic illumination control
- Easy to clean

## Animal Management

- Large 20x20 cm FOV for multi-subject imaging
- Heated animal bed
- EQUAFLOW™ breather to deliver equal gas to each nose cone to prevent unwanted animals awakening
- Active gas scavengers
- Compatible with the BIOSTHESIA gas anesthesia system
- Up to 5 mice

## Non-Invasive Imaging

The NEWTON bioluminescence imaging mode allows the non-invasive detection and quantification of orthotopic, metastatic and spontaneous tumors in the whole mouse. The system allows you to monitor tumor development right from the onset and collect and compare data throughout tumor development.





## NEWTON 7.0 - FT-400

Bioluminescence & fluorescence detection

### CAMERA & OPTICS

Scientific grade 16-bit CCD camera

Grade 0, 400-900nm / 4.8 O.D.

-90°C delta cooling differential cooling via 4-stages Peltier thermoelectric coolers

Lens aperture: f/0.70 motorized lens aperture

Image resolution: 10 megapixels

Native resolution: 2160x2160

Peak Quantum Efficiency: 80% (estimated to increase by 10% with f/0.70 lens)

FOV minimum: 6x6cm (macro imaging)

FOV maximum: 20x20cm (5 animals capacity)

### ILLUMINATION

8 excitation channels (software controlled):

420nm - 480nm - 520nm - 580nm

640nm - 680nm - 740nm - 780nm

10-position motorized filter wheel (software controlled)

8 narrow bandpass emission filters with less than 35nm bandwidth:

500nm - 550nm - 600nm - 650nm

700nm - 750nm - 800nm - 850nm

### HARDWARE CAPABILITIES

Intelligent Darkroom concept

Fully-automatic system:

- Motorized optical lens
- Z-axis motorized camera
- X/Y-axis motorized sample stage

### ANIMAL MANAGEMENT

Biosthesis gas anesthesia station

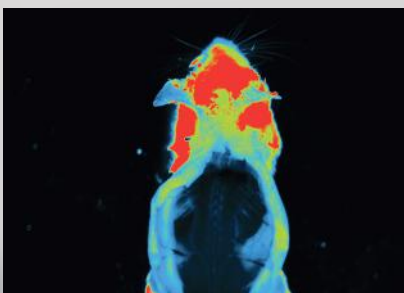
Heated Mouse Pad

Animal breather for 5 mice

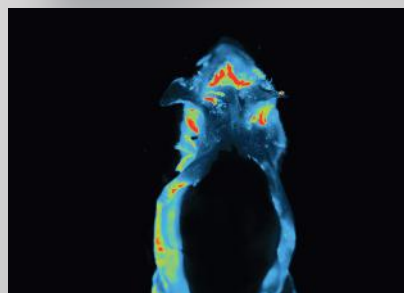
Waste gas scavenger

### SOFTWARE

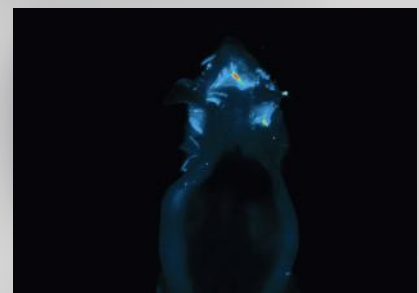
Advanced software for image acquisition and quantitative analysis including Auto-Fluorescence correction, Spectral Unmixing, Deconvolution suitable for fluorescence, bioluminescence and chemiluminescence based in vivo and in vitro imaging studies.



*Blue excitation  
High autofluorescence*



*Green excitation  
Moderate autofluorescence*



*Near infrared excitation  
Low autofluorescence*



### **HEADQUARTERS**

Vilber Lourmat  
ZAC de Lamirault  
Collegien  
F-77601 Marne-la-Vallee cedex 3  
France  
Phone : + 33 (0) 1 60 06 07 71  
[info@vilber.com](mailto:info@vilber.com)

### **GERMANY**

Vilber Lourmat  
Deutschland GmbH  
Wielandstrasse 2  
D-88436 Eberhardzell  
Deutschland  
Phone : + 49 (0) 7355 931 380  
[info@vilber.de](mailto:info@vilber.de)

### **CHINA**

Vilber China  
Room 127 Building A  
N° 111 Yuquangying  
Fengtai District – Beijing  
China  
Phone : + 86 1361 1131 545  
[info@vilber.cn](mailto:info@vilber.cn)