DeltaVision™ OMX

The DeltaVision OMX imaging platform is an advanced multimode, super-resolution microscope system representing the next generation of microscopy evolution. DeltaVision OMX system offers super-resolution imaging using 3D structured illumination (3D-SIM) and Localization Microscopy with the optional DeltaVision Localization Microscopy system. The innovative Blaze SIM Module offers dynamic high speed 3D-SIM, which has made live cell super-resolution imaging a reality. Blaze incorporates a proprietary, ultra-fast, structured illumination module, advanced optical platform design and the latest high-speed camera technologies. This improves both temporal and spatial resolution in dynamic living samples.

- Supports dual super-resolution modes, 3D-SIM and Localization Microscopy
- Extremely fast, multicamera widefield imaging capability
- Advanced Ring-Total Internal Reflection Fluorescence (TIRF) with PhotoKinetics/PhotoActivation (PK/PA) imaging system

Fig 1. DeltaVision OMX Super-resolution Microscope System.

DeltaVision OMX Microscope

Traditional microscopes do not have the precision, alignment or stability required to properly perform 3D SIM super resolution imaging. The unique design of the DeltaVision OMX microscope was developed specifically to create a highly stable, multi-channel, imaging platform for advanced microscopy applications.

- Hardware and software platform exclusively licensed to GE Healthcare
- Extremely stable optical platform optimized for super-resolution imaging and multi-camera operation
- Multiple illumination modalities:
  - Structured illumination 3D-SIM
  - Widefield imaging
  - Optional TIRF and PK/PA
  - Optional Localization Microscopy

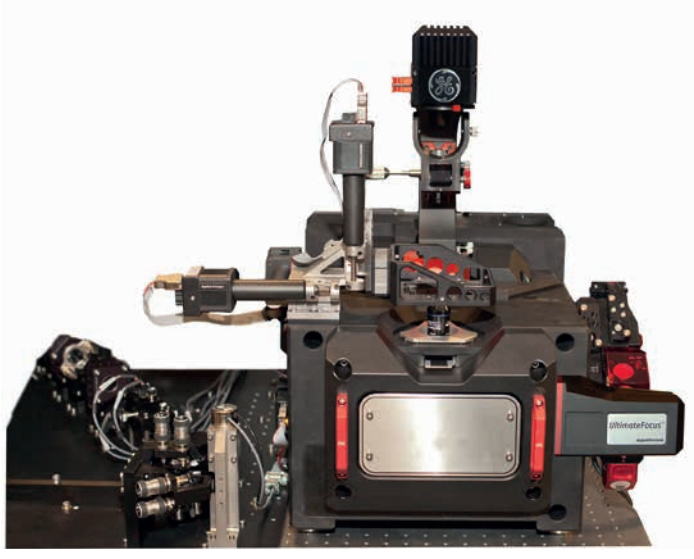

Fig 2. DeltaVision OMX Optical Platform showing main microscope system and Blaze module.

UltimateFocus Hardware Autofocus System

Standard on all DeltaVision OMX systems is our exclusive UltimateFocus Hardware Autofocus technology, similar to that found on our DeltaVision Elite imaging systems. The laser based hardware autofocus enables our exclusive focus finding feature that can quickly bring a sample into focus then lock on to track the focal position long term.

- Patented design laser based hardware autofocus
- Seamless integration into specimen location and scanning workflow with Spiral Mosaic automated "pan and scan" function

Fig 3. Close up of UltimateFocus hardware autofocus module.

Table 1. UltimateFocus Hardware Autofocus Module details

Parameter	Value
Focus precision	25 nm
Response time	200 ms
Laser	785 nm

Stage Operation

Incorporating the same Nanomover™ motor technology found in our DeltaVision Elite stages, the DeltaVision OMX stage offers high precision control and accuracy. The Z-axis control also has an additional piezoelectric drive for high speed fine position control during z-stack acquisition.

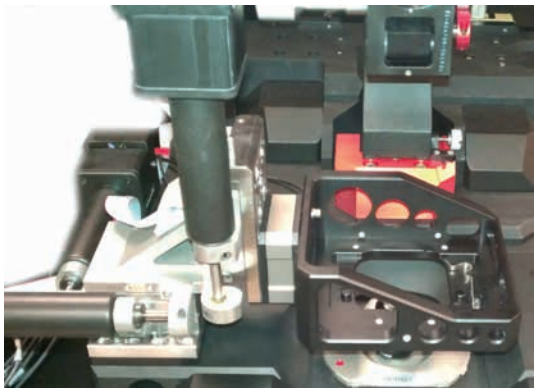

Fig 4. DeltaVision OMX sample stage on microscope block.

Table 2. DeltaVision OMX stage specifications

Parameter	Expected value range	Notes
Stage range (XY)	25 × 25 mm	
Y flatness	< 10 µm per 10 mm travel	Determined at factory and installation
X flatness	< 10 µm per 10 mm travel	Determined at factory and installation
Z piezo repeatability	± 50 nm	30 µm maximum range during Z stack acquisition. 100 µm total travel range
XYZ Nanomover repeatability	± 100 nm	25 mm total travel
Z piezo step resolution	4 nm	
XYZ Nanomover step resolution	10 nm	
Sample holders	Standard 75 × 25 mm slides 35 mm dishes Multichamber coverslips Note: Travel range of stage gives observable area over center 25 mm of slides and multichambered coverslips	

DeltaVision OMX with Blaze SIM Module

The DeltaVision OMX system Blaze SIM Module is GE Healthcare's patented Blaze Structured Illumination light engine technology. The Blaze SIM Module generates an illumination pattern in three dimensions giving a twofold resolution improvement in the X, Y and Z directions. This translates into an eight fold increase for a 3D volume. The Blaze design consists of an opto-mechanical light pattern generator incorporating high speed galvanometers for manipulating the light beams necessary to generate the 3D-SIM pattern. This is essential as simple line gratings cannot generate the necessary pattern to allow full three dimensional super resolution reconstruction or fully optimize for each excitation wavelength.

- 3D-SIM imaging at 110 to 160 nm lateral and 330 to 350 nm axial resolution (wavelength and optics dependent)
- Exclusive high speed galvanometer controlled structured illumination pattern generating system
- Full optimization of SIM pattern for each excitation wavelength giving optimal resolution at each wavelength

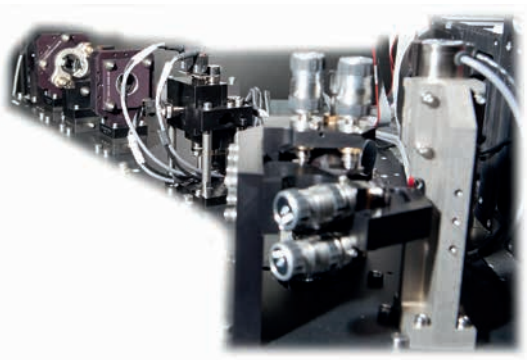

Fig 5. Blaze Structured Illumination Module (SIM).

3D-SIM resolution

The DeltaVision OMX system offers wavelength optimized 3D-SIM resolution for each excitation wavelength used by the system. The values in the table represent expected resolutions based on current system performance and optical design.

Table 3. 3D-SIM resolution at different wavelengths

Excitation wavelength	3D-SIM XY resolution	Expected 3D SIM Z resolution
405 nm	110 ± 5 nm	340 ± 10 nm
445 nm	115 ± 5 nm	340 ± 10 nm
488 nm	120 ± 5 nm	340 ± 10 nm
514 nm	120 ± 5 nm	350 ± 10 nm
568 nm	135 ± 5 nm	350 ± 15 nm
642 nm	160 ± 5 nm	380 ± 20 nm

Resolutions are wavelength and optics dependent. Values presented are nominal expected values

Camera technical details

The system offers a choice between two types of camera technology based on the user's needs. The scientific CMOS camera is an ideal all-round choice for high speed and low light sensitivity. For situations where detection of very low photon numbers is needed such as single molecule imaging we also offer the Evolve™ EMCCD camera. Please note that it is not possible to mix EMCCD and sCMOS cameras on a DeltaVision OMX system. While the system can support multiple cameras they must all be of the same type.

Table 4. Camera specifications

	pco.edge sCMOS	Evolve EMCCD
Code number	52-852636-400	52-852634-400
Manufacturer	PCO	Photometrics
Chip type	Front Illuminated sCMOS	Back Thinned Frame Transfer CCD
Chip size	2560 × 2160 pixels*	512 × 512 pixels
Pixel size	6.5 µm	16 µm
Readout speeds	95 MHz, 286 Mhz	5 MHz, 10 MHz
Readout modes	Rolling Shutter, Global Shutter	Conventional Mode, EM Mode
Camera interface	Camera-Link	Turbo-Firewire
Bit depth	15 bit	16 bit
Quantum efficiency	~ 60%	~ 87%
Dynamic range	1:15 000	1:10 000
Read noise	1.5 e at 33 fps 2 e at 100 fps	10 MHz EM - 45 e 5 MHz EM – 32 e 5 MHz non EM – 12 e
On chip binning	Not supported	Supported

* Currently the working area of the chip is limited to 512 × 512 for SIM imaging and 1024 × 1024 for Widefield and TIRF imaging. This is due to the geometry of the optics and vignetting effects near the edge of the field of view (FOV).

Table 5. Pixel size for 3D-SIM applications

Camera type	Camera pixel size	Optical configuration	Image pixel size
sCMOS	6.5 µm	60× objective magnification + 1.3× intermediate tube lens	80 nm
EMCCD	16 µm	100× objective magnification + 2× intermediate tube lens	80 nm

Pixel size is constrained for 3D-SIM applications to 80 nm lateral and 125 nm Z step size for sampling purposes.

Table 6. DeltaVision OMX operational speed with sCMOS cameras

Parameter	Expected value range	Notes
SIM Imaging	1 sec per 1 µm stack	512 × 512, 1 ms exp, 125 nm step, 8 slices, 15 images per slide (120 images total, ~ 120 fps)
Stack reconstruction time	~ 13 sec per µ per channel*	512 × 512, 5 ms exp, 125 nm step, 8 slices, 15 images per slide (120 images total), 1 color

* Note this can be variable and is not considered a specification due to the changing nature of computer hardware and software configurations.

Table 7. DeltaVision OMX operational speed with EMCCD cameras

Parameter	Expected value range	Notes
SIM Imaging	~ 4.8 sec per 1 µm stack	512 × 512, 5 ms exp, 125 nm step, 8 slices, 15 images per slide (120 images total, ~ 28 fps)
Stack reconstruction time	~ 13 sec per µ per channel*	512 × 512, 5 ms exp, 125 nm step, 8 slices, 15 images per slide (120 images total), 1 color

* Note this can be variable and is not considered a specification due to the changing nature of computer hardware and software configurations.

High speed widefield imaging

In addition to its super-resolution capability, the DeltaVision OMX system is capable of high speed widefield imaging using our exclusive custom designed InSightSSI solid state illumination system. The DeltaVision OMX platform's multi-camera capability, supporting simultaneous operation of up to 4 cameras, and fast sCMOS cameras allow the DeltaVision OMX to image at very high speeds.

- Imaging speeds over 350 frames per second
- Exclusive 6 color solid state illumination system capable of running 4 simultaneous excitation wavelengths
- Optional widefield illumination via TIRF module
- Diffraction limited widefield resolution

Table 8. Widefield imaging acquisition speed with sCMOS cameras

Region of interest	95 MHz readout FPS	Single frame	286 MHz readout FPS	Single frame
256 × 256	202	4.91 ms	387	2.57 ms
512 × 512	118	8.40 ms	266	3.73 ms
1024 × 1024	64	15.4 ms	163	6.06 ms

1 ms exposure, no Z move or time delay
Note: Multicamera acquisition at high speed will be limited by slowest exposure time and requirement to synchronize cameras

Table 9. Widefield imaging acquisition speed with EMCCD cameras

Region of interest	10 MHz readout FPS	Single frame
256 × 256	50 fps	20 ms
512 × 512	31 fps	32 ms

1 ms exposure, no Z move or time delay
Note: Multicamera acquisition at high speed will be limited by slowest exposure time and requirement to synchronize cameras

Table 10. Widefield resolution

Excitation Wavelength	Widefield XY resolution	Widefield Z resolution
405 nm	210 ± 10 nm	400 ± 20 nm
445 nm	230 ± 10 nm	450 ± 20 nm
488 nm	250 ± 10 nm	500 ± 20 nm
514 nm	270 ± 10 nm	520 ± 20 nm
568 nm	300 ± 10 nm	580 ± 20 nm
642 nm	350 ± 10 nm	660 ± 20 nm

Resolutions are wavelength and optics dependent. Values presented are nominal expected values

Table 11. Pixel size for widefield and TIRF applications

Camera type	Camera pixel size	40× objective pixel size	60× objective pixel size	100× objective pixel size
sCMOS	6.5 µm	120 nm	80 nm	48 nm*
EMCCD	16 µm	195 nm**	130 nm	80 nm

*Pixel size is oversampled which can lead to increased noise which may be undesirable for localization imaging.
**Lateral pixel size would be undersampled for deconvolution.

Optional advanced TIRF/PK module

The DeltaVision OMX system can also be fitted with an optional TIRF module that incorporates a novel design exclusively licensed to GE Healthcare from Yale University. The Ring TIRF design rotates the laser beam rapidly at the back focal plane of the objective lens. This generates the TIRF field almost simultaneously from multiple points resulting in a highly uniform TIRF illumination. The TIRF module also incorporates an optical path that allows focusing and position control of the laser for PK applications.

- High speed galvanometer controlled beam steering module, 300 Hz rotation speed
- Rapidly adjustable beam rotation to optimize TIRF depth penetration
- Fast switching between TIRF and PK operation

Fig 6. The advanced TIRF/PK module.

Table 12. TIRF/PK module specifications

TIRF/PK module	Details
Code number	53-853031-000
TIRF Scan Speed	300 Hz, scan diameter adjustable.
PK spot size	1 µm at 60×
PK position control	Galvonometer control allows for point, circle, ellipse or rectangle pattern bleaching within sample
TIRF to PK switch time	~ 12 ms

DeltaVision Localization Microscopy option

DeltaVision Localization Microscopy System is an advanced imaging option for the DeltaVision Elite and DeltaVision OMX platforms. It employs TIRF imaging in combination with laser activation control to acquire frames of fluorophore images. These images are analyzed with our exclusive Dense Stochastic Sampling Imaging (DSSI) algorithm, which uses multiple-Gaussian fitting to find the locations of fluorophores within a sample; the fluorophore locations are used to reconstruct a super-resolution image.

- Provides 2-D resolution between 20 and 50 nm (subject to appropriate sample preparation, labeling density, and localization precision)
- Compatible with photoactivation, photoconversion, and photoswitching fluorophore systems
- DSSI algorithm can resolve overlapping signals from fluorophores spaced closer than the diffraction limit in dense fields, thereby enabling localization at higher densities

Table 13. Localization Microscopy specifications

Localization option	Details
Code number	29087663 (for newly configured systems only)
2D localization precision	~ 20 nm. Localization precision is dependent on the number of photons collected
2D lateral resolution	< 50 nm. Subject to appropriate sample preparation and labeling density. Achievable under ideal conditions
Fluorophore system	Photoactivation, photoconversion, photoswitching
Lasers supported	405 nm, 100 mW 488 nm, 100 mW 568 nm, 100 mW 642 nm, 110 mW
Laser intensity control	Direct laser control and neutral density (ND) filters for additional attenuation
Laser shuttering	~ 2 ms fast electronic shutters or 200 µs high-speed galvanometer shutters
Activation laser control	Laser intensity adjustable during acquisition. Pulse duration fixed for experiment
Cameras supported	pco.edge sCMOS or Evolve EMCCD
Objective lenses	pco.edge sCMOS: 60× objective Evolve EMCCD: 60×, 100× objectives
Acquisition pixel size	pco.edge sCMOS: 82 nm at 60× objective Evolve EMCCD: 133 nm at 60× objective Evolve EMCCD: 80 nm at 100× objective

DeltaVision OMX laser system

The DeltaVision OMX system can handle up to 6 lasers which will support a wide variety of fluorophore types and application needs. The lasers are controlled through a choice of standard electronic shutters or our exclusive high speed galvanometer controlled shutters.

Table 14. Laser shutter speeds

Shutter type	Open/Close times
Standard Shutters	~ 1.8 ms
High Speed Galvo Shutters	~ 200 µs

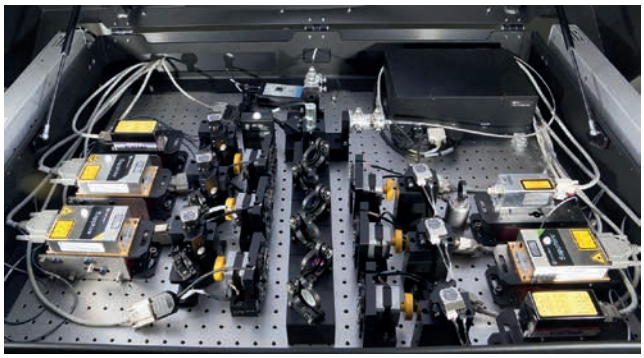

Fig 7. DeltaVision OMX laser system.

Table 15. DeltaVision OMX Laser specifications

Laser	405 nm	445 nm	488 nm	514 nm	568 nm	642 nm
Code number - Standard shutter configuration	53-853248-405	53-853248-445	53-853248-488	53-853248-514	53-853248-568	53-853248-642
Code number - High speed shutter coinfiguration	53-853249-405	53-853249-445	53-853249-488	53-853249-514	53-853249-568	53-853249-642
Type	Diode	Diode	OPSL	OPSL	OPSL	Diode
Wavelength (nm)	405 ± 2	445 ± 5	488 ± 2	515 ± 2	568 ± 1	642 ± 2
Power output (mW)	100 ± 10	100 ± 5	100 ± 4	100 ± 6	100 ± 4	110 ± 10
Spatial mode	TEM∞	TEM∞	TEM∞	TEM∞	TEM∞	TEM∞
Beam diameter (mm, 1/e2)	~ 0.8	~ 0.7	~ 0.7	~ 0.7	~ 0.7	~ 0.8
Beam divergence (mrad)	~ 1.0	< 0.2	< 1.2	< 1.3	< 1.3	~ 1.0
M^2 (typical)	< 1.25	< 1.2	< 1.1	< 1.1	< 1.1	< 1.25
Pointing stability (µrad/ C)	< 5	< 5	< 10	< 10	< 10	< 5
Power stability (over 24 hours)	< 0.5%	< 0.5%	< 0.6%	< 0.6%	< 0.6%	< 0.5%
Polarization orientation	Vertical ± 2	Vertical	Vertical	Vertical	Vertical	Vertical ± 5
Polarization extinction ratio	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1	> 100:1
RMS noise (10 Hz to 10 MHz)	< 0.1%	< 0.2%	< 0.25%	< 0.25	< 0.25	< 0.1%
Input power (head)	12 V DC, 1.5 A (max.)	5.00 V DC	10.8–15 V DC	10.8–15 V DC	10.8–15 V DC	12 V DC, 1.5 A (max.)
Communication	Mini-USB and RS-232	USB 2.0 and RS-232	USB 2.0 and RS-232	USB 2.0 and RS-232	USB 2.0 and RS-232	Mini-USB and RS-232
CDRH class	Class IIIb	Class IIIb	Class IIIb	Class IIIb	Class IIIb	Class IIIb
ESD protection	Class 4	Class 4	Class 4	Class 4	Class 4	Class 4
EU compliance	CE Mark Certified with control box	CE Mark Certified	CE Mark Certified	CE Mark Certified	CE Mark Certified	CE Mark Certified with control box
RoHS compliance	EU and China	EU and China	EU and China	EU and China	EU and China	EU and China

Widefield illumination source

DeltaVision OMX uses a proprietary solid state illumination system, the InsightSSI. The InsightSSI illumination module provides extremely stable and long lasting illumination with electronic control for instant on/off operation. Power on and switching between wavelengths takes less than 1 ms making the InsightSSI an ideal illumination source for multicolor imaging, particularly for fast dynamics.

- Fast power on and wavelength switching
- Up to 4 channels can be used at once for simultaneous multicolor imaging
- 1 mm fiber for even illumination across the specimen

Table 16. Widefield illumination source specifications

Item	Details
6 Color solid state illumination module	Color range supported DAPI/ CFP/GFP, FITC/YFP/ Alexa Fluor™ 568, mCherry /Cy™5
Switching time	< 1 ms
On time to 100%	< 150 µS
Off time to 0%	< 8 µS
Operational lifetime	> 5000 h
Optical fiber	1 mm diameter, 0.37 numerical aperture (NA)

Table 17. InsightSSI unit operational specifications

Fluorophore	Color	Wavelength range (nm)	Center/ Bandpass (nm)	Nominal power (mW) Min.	Max.
DAPI	Blue	381–410	395.5/29	80	140
CFP	Cyan	426–450	438/24	80	140
FITC/GFP	Green	461–493	477/32	55	110
YFP	Yellow	505–520	512.5/15	11	35
mCherry	Red	562–581	571.5/19	60	125
Cy5/DIC	Far Red	638–653	645.5/15	20	45

DIC = differential interference contrast

Emission filter wheel details

Depending on the system configuration the DeltaVision OMX system can be fitted with one or two multi-position filterwheels to allow additional flexibility in emission wavelength choice.

Table 18. Emission filter wheel specifications

Item	Details
Emission filter wheel	10-position interchangeable filter wheel
Filter size	25 mm
Switching time	250 ms between adjacent positions

Filter details

The DeltaVision OMX optical filters are designed so that the same filters and polychroic mirrors are utilized for both Laser and SSI illumination.

Table 19. Excitation filters

Channel	Center wavelength (nm)	Bandwidth (nm)	Absolute transmission (%T)	Blocking range (nm)
DAPI	395.5 ± 2.0	29.0 ± 2.0	≥ 90	300–371, 420–710
FITC	477.0 ± 2.0	32.0 ± 2.0	≥ 90	300–451, 503–710
mCherry, Alexa Fluor 568	571.0 ± 2.0	19.0 ± 2.0	≥ 90	300–552, 591–710
Cy5	645.5 ± 2.0	15.0 ± 2.0	≥ 90	300–628, 663–710
CFP	438.0 ± 2.0	24.0 ± 2.0	≥ 90	300–416, 460–710
YFP	512.5 ± 2.0	15.0 ± 2.0	≥ 90	300–495, 530–710

Table 20. Emission filters

Channel	Center wavelength (nm)	Bandwidth (nm)	Absolute transmission (%T)	Blocking range (nm)
DAPI	435.5 ± 2.0	31.0 ± 2.0	≥ 90	300–410, 461–710
FITC	528.0 ± 2.0	48.0 ± 2.0	≥ 90	300–494, 562–710
mCherry, Alexa Fluor 568	609.0 ± 2.0	37.0 ± 2.0	≥ 90	300–580.5, 637–710
Cy5	683.0 ± 2.0	40.0 ± 2.0	≥ 90	300–653
CFP	477.5 ± 2.0	35.0 ± 2.0	≥ 90	300–450, 505–710
YFP	541.0 ± 2.0	22.0 ± 2.0	≥ 90	300–520, 562–710

Table 21. Polychroic DAPI/FITC/Alexa Fluor 568/Cy5

Region	Channel*	Band (nm)	Absolute transmission (%T)	Average transmission (%T)	Laser line (nm)	Phase band (nm)	Phase control (°)
Transmission #1	DAPI EM	421–450	> 80%	> 90%	–	–	–
Reflection #1	DAPI EX	382–409	< 20%	< 10%	405	403–407	≤ 30
Transmission #2	FITC EM	505–549	> 80%	> 90%	–	–	–
Reflection #2	FITC EX	462–492	< 20%	< 10%	488	487–489	≤ 30
Transmission #3	Alexa Fluor 568 EM	591.5–626.5	> 80%	> 90%	–	–	–
Reflection #3	Alexa Fluor 568 EX	561–580	< 20%	< 10%	568	561–569	≤ 30
Transmission #4	Cy5 EM	664–702	> 80%	> 90%	–	–	–
Reflection #4	Cy5 EX	639–652	< 20%	< 10%	640	639–644	≤ 30

Table 22. Polychroic CFP/YFP/mCherry/Cy5

Region	Channel*	Band (nm)	Absolute transmission (%T)	Average transmission (%T)	Laser line (nm)	Phase band (nm)	Phase control (°)
Transmission #1	CFP EM	461–494	> 80%	> 90%		–	–
Reflection #1	CFP EX	427–449	< 20%	< 10%	445	440–449	≤ 30°
Transmission #2	YFP EM	531–551	> 80%	> 90%	–	–	–
Reflection #2	YFP EX	506–519	< 20%	< 10%	514	513–517	≤ 30°
Transmission #3	mCherry EM	591.5–626.5	> 80%	> 90%	–	–	–
Reflection #3	mCherry EX	563–580	< 20%	< 10%	568	567–569	≤ 30°
Transmission #4	Cy5 EM	664–702	> 80%	> 90%	–	–	–
Reflection #4	Cy5 EX	639–652	< 20%	< 10%	642	639–644	≤ 30°

*EM =emission; EX = excitation

System enclosure

The entire DeltaVision OMX microscope is enclosed in a special cabinet that helps control temperature fluctuations, room airflow vibrations and acoustic noise that are critical when imaging at the sub-micron level. This also allows the system to be operated in any room environment eliminating the need to darkrooms or special facilities.

- Class 1 Laser safe device with laser safety interlock shutters and warning indicators
- Entire system enclosure enables operation in a normal laboratory environment, no darkroom needed
- HEPA air filtration with internal positive pressure environment to minimize dust contamination of optical surfaces

Table 23. System enclosure dimensions

Component	Sizes US/Imperial (h × w × d, in)	Metric (h × w × d, mm)
Main optics cabinet	82 × 52 × 55	2083 × 1372 × 1398
Laser/electronics cabinet	72 × 55 × 35	1829 × 1397 × 889
Workstation table	31 × 52 × 33	787 × 1321 × 838

For more specific details about sizes, weights and power requirements please contact our Service department for a copy of the DeltaVision OMX Site Preparation Guide documentation that covers these topics in much more detail and is available upon request.

Integrated electronics and laser control cabinet

To enable faster control of the system timing and trigger events the DeltaVision OMX system utilizes a custom programmable gate array that allows simultaneous control and activation of multiple system events. The result is extremely low operational overhead and superior event timing control that allows the system to operate at speeds beyond typical microscopes. The system electronics are housed in a dedicate enclosure that also contains the laser table, computers and interface controllers.

Fig 8. Electronics and laser control cabinet.

General electronics control systems

Components housed in laser table electronics rack.

- Camera control computers (number depends on system configuration)
- OMXIC chassis
- Nanomover controller
- Laser control chassis
- Network switch
- Power interface
- Galvanometer control chassis

Table 24. DeltaVision OMX workstations hardware specifications*

Feature	DV OMX master	DV OMX SI workstation
CPU	Intel™ Core™ i7	Intel Core i7
Clock speed	3.4 GHz	3.4 GHz
Memory	16 GB DDR3 1333 MHz ECC	16 GB DDR3 1333 MHz ECC
Power supply	500 W	500 W
Drives	1 TB SATA boot drive	1 TB SATA Boot Drive
RAID	None	3 × 1 TB SATA in RAID5 configuration
Video card	NVIDIA™ NVS300	NVIDIA NVS300
VRAM	512 MB	512 MB
Video Bus	PCIE	PCIE
Monitor	24 in	24 in
Resolution	1920 × 1200	1920 × 1200
Operating System	Windows® 7	CentOS v6 or better

*Computer specifications are subject to change without notice

Table 25. Standard monitor supplied with the system

Model	Dell™ U2413 or equivalent
Panel size (diagonal)	24 in (61 cm)
Aspect ratio	Widescreen (16:10)
Panel type	IPS (In-plane switching)
Optimal resolution	1920 × 1200 at 60 Hz
Contrast ratio (typical)	1000 to 1
Dynamic contrast ratio (maximum)	80 000:1
Brightness (typical)	400 cd/m^2
Response time (gray to gray)	6 ms
Maximum viewing angle	178° vertical / 178° horizontal
Color support	1.07 billion colors
Color gamut	110% (CIE 1976)
Pixel pitch	0.27 mm (94 pixels/in)

Optional offline analysis workstation

If desired additional offline analysis workstations can be purchased when additional computing power is need for large tasks. These workstations have the same specifications as the workstations detailed above and are provided with the appropriate licensing for 3D-SIM reconstruction.

Table 26. DeltaVision OMX offline workstation ordering information

Code number	53-853053-000
Description	DeltaVision OMX offline workstation with CentOS v6 or higher and SoftWoRx™ V6.1 or higher

DeltaVision SoftWoRx software

The DeltaVision OMX system is controlled using the OMX Acquisition control software running on the OMX Master computer under Windows 7 operating system. Image reconstruction and analysis is performed using our SoftWoRx software package running on the SI workstation running under the CentOS v6 (Linux) operating system. Included in the SoftWoRx software are the algorithms necessary to reconstruct the 3D-SIM super-resolved images as well as our proprietary quantitative deconvolution algorithms for widefield images.

In addition SoftWoRx includes a variety of visualization and routine analysis tools for viewing acquired data and performing quantitative analysis.

Available as options are SoftWoRx Explorer, a Windows based file viewer and SoftWoRx Suite, a more advanced visualization and analysis package which includes our exclusive deconvolution algorithm for image reconstruction.

Table 27. DeltaVision software details

Item	Details
Image acquisition	OMX Acquisition control software
Image acquisition and operational control	OMX Master control software
Image reconstruction and analysis	SoftWoRx v 6.1 or higher
General SoftWoRx functionality	Exported image formats: JPG, TIFF
	Exported video formats: AVI, Quicktime
	Volume rendering and 3D visualization
	Measuring tools: Line Profile, Polygon Analysis, Intensity Plots
	Data analysis and export to spreadsheet via CSV file format
Advanced 3D volume visualization (optional)	We partner with Bitplane Inc. and offer Imaris™ software for those customers seeking an advanced 3D visualization package.

Schematic diagram

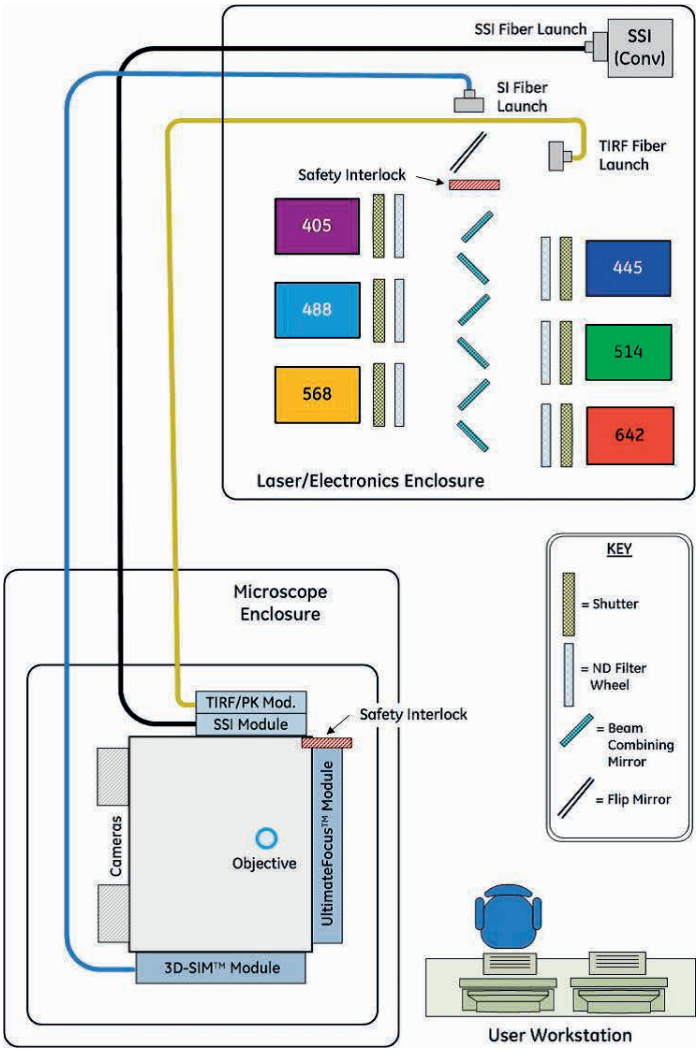

Fig 9. DeltaVision OMX system diagram.

System dimensions

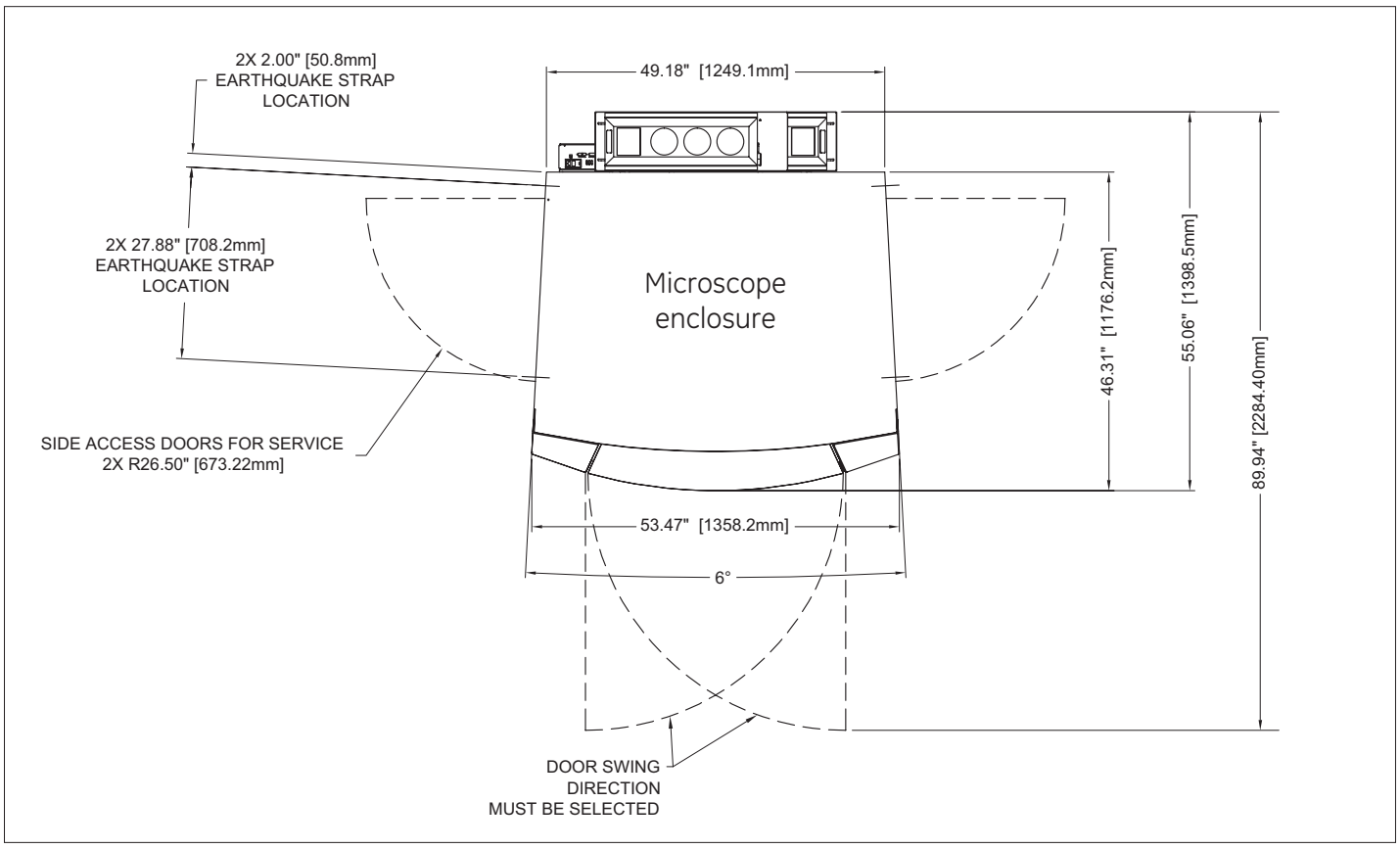

Fig 10. Microscope enclosure dimensions and layout. Please note door openings when considering space requirements for system.

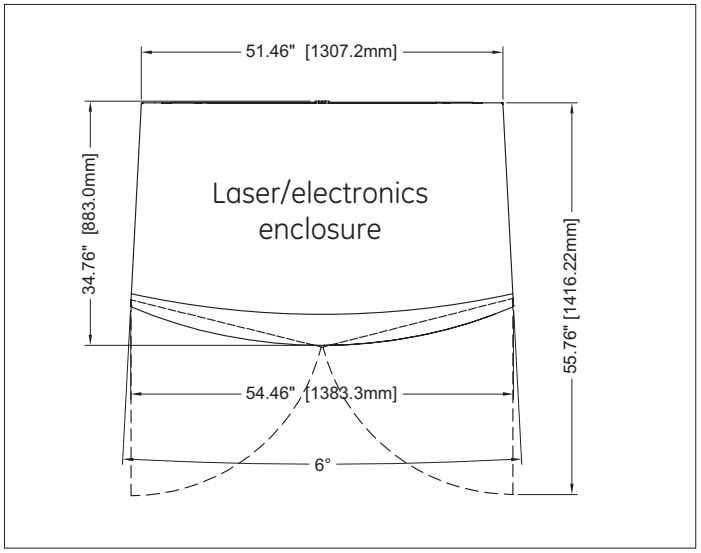

Fig 11. Laser/electronics enclosure dimensions.

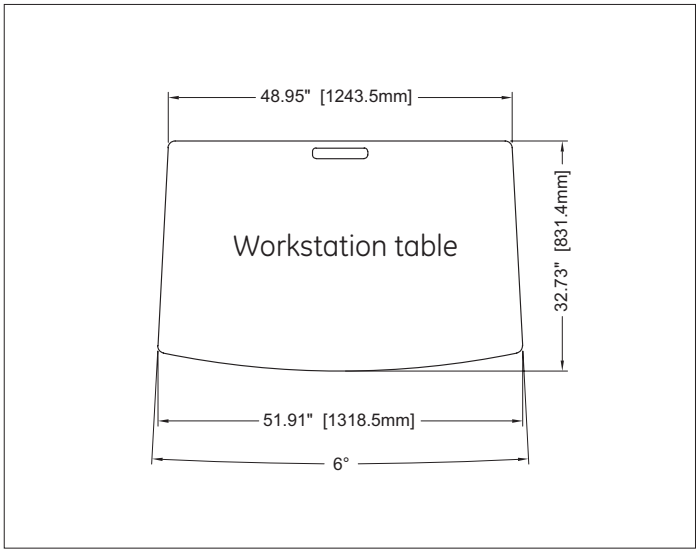

Fig 12. Workstation table dimensions.

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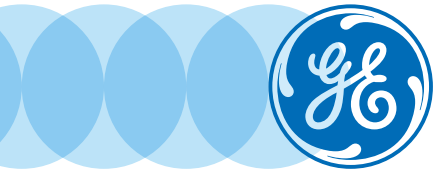

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