

Application Customizer

September 2009

Artemis **3DHD**
VIS-NIR



Customized Artemis

The world of multi-spectral imaging is rapidly expanding with new applications. In many cases these new applications are made possible because of new technological achievements. In the area of (pre-) clinical multi-spectral imaging extensive research has been performed with very promising results. Many applications with indocyanine green dye (ICG) or NIRF probes are at the point of emerging in clinical evaluation or even practice. Just waiting for a good camera platform made available.....

This moment has arrived with the introduction of the Artemis Multispectral Platform.

What is the scope of clinical applications for the Artemis Camera System?

The Artemis has been designed for “open surgery with multispectral enhancement”, specifically for:

- Oxygen saturation measurement
- NIRF probe tumor resection
- ICG dye lymph node identification
- Vascularisation measurement

Per application dedicated hardware choices must be made for optimal results. This document has the intention to make you familiar with “thinking in Artemis variables”.

1. Stereoscopy

Artemis is designed with two optical axes / camera systems for true stereoscopic vision. This implies that you could divide certain choices in a left and right difference. For example: dichroic splitting in prism's with filters glued on IR channel 2 for the identification of two different NIRF probes. This could also be done with sensors and removable filters. So: think left and right.....



2. Dichroic splitting and filtering

Equipped as the world's first camera system with 5-channel prisms (and two of these in one platform!) with near perfectly aligned sensors glued on the prism, the possibilities are enormous. With practically no loss of photons you can split your image into 5 spectral bands, one band per channel. Sensors and electronics capture the images you need on the fly with the possibilities of pixel to pixel calculations and modifications in real-time. Every

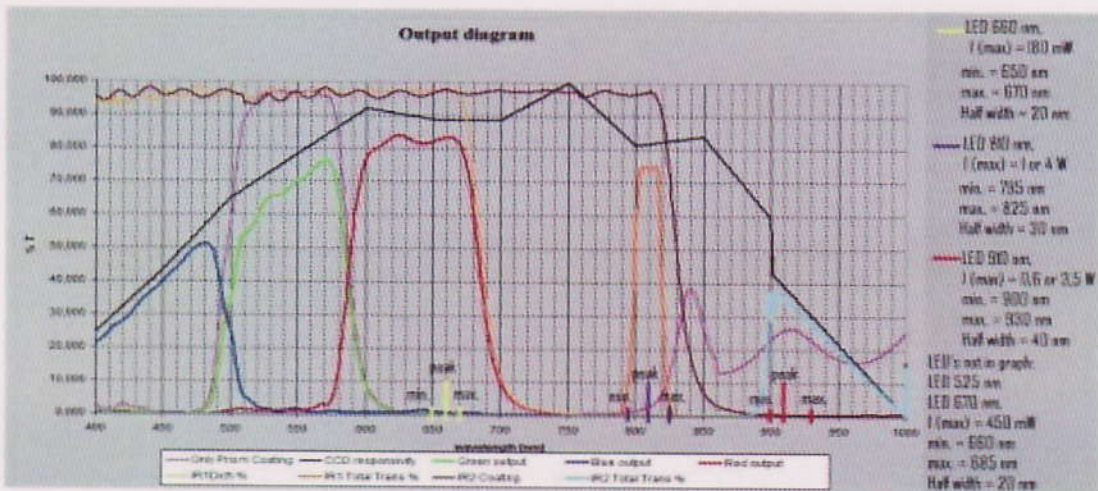
channel has the possibility of a fixed filter of your choice. For example, for ICG dye fluorescence capturing we recommend a long pass filter of 795 nm on IR channel II in order to block out 99,999 % of the excitation light. For oxygen saturation measurement we recommend a narrow band filter in IR channel II with a band from 790 – 830 nm to select the isobestic area.



5-channel prism with dichroic splitting



with sensors and filters aligned

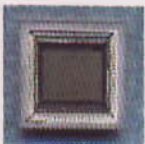


Typical dichroic coating design sheet. In this case for the StO₂-optimized channel.

3. Choice of sensors

Depending on the application (signal/ambient conditions) certain sensors with a high signal/noise ratio (SNR) might be used in one or more channels. Standard the Artemis is equipped with a good sensor for a broad range of applications. This implies that it might not be the best sensor for a specific demanding condition. If you would feel the need for, e.g., a back-cooled latest generation CCD-sensor and its physical dimensions would not exceed Artemis' limits (2/3 inch), we are open to evaluate with you the changes needed to incorporate that specific sensor for your application.

Not every sensor combination will result in an outstanding product. We can advise you on your preferred combination of sensors. If a combination of sensors with different pixel size is chosen, near perfect pixel to pixel alignment and calculations would by definition not be possible. Your choice!



4. Removable optical filter system

The Artemis camera is equipped with a filter holder that has two positions: no filter (neutral) or a dedicated filter. Each position can be selected with a push of a button, instantaneously modifying the complete optical path

This mechanism is placed in the left and right axis, just before the motor driven iris.

For StO₂ measurements one filter is recommended to cut of all red reflected light below the plateau level. Also a configuration for 5 exchangeable filters between sensor and prism is available.



Contact

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5. Lighting system

Artemis can be equipped with direct LED or laser-light sources illumination through Digital Micro-mirror Device (DLP) zoom projection via the 3 channel prism. With the right choice of wavelength and power, your area of interest can be lighted / excited as needed. Also external light sources can be connected.



ARTEMIS Customization Information Request Form
All information will be treated confidential

Organization Name

Your name

Position

Address

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Email

Phone

Discription of Application

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Left Optical Axis				Right Optical Axis			
Left Prism				Right Prism			
Channel #	Dichroic Coating: Channel Wavelength Range (in nm)	Replaceable Filter Specification	Sensor (Type & Model)	Channel #	Dichroic Coating: Channel Wavelength Range (in nm)	Replaceable Filter Specification	Sensor (Type & Model)
#1				#1			
#2				#2			
#3				#3			
#4				#4			
#5				#5			
Switch filter	Position 1: Position 2:			Switch filter	Position 1: Position 2:		

Lighting

Direct LED/laser Illumination	Wavelength (nm)	Power (W)	Angle of Emission (°)

DMD Lightning	Wavelength #	Internal Lightsource	External Lightsource
	1		
	2		
	3		

	Artemis		
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Dichroic coating / Sensor Quantum Efficiency Design Sheet

