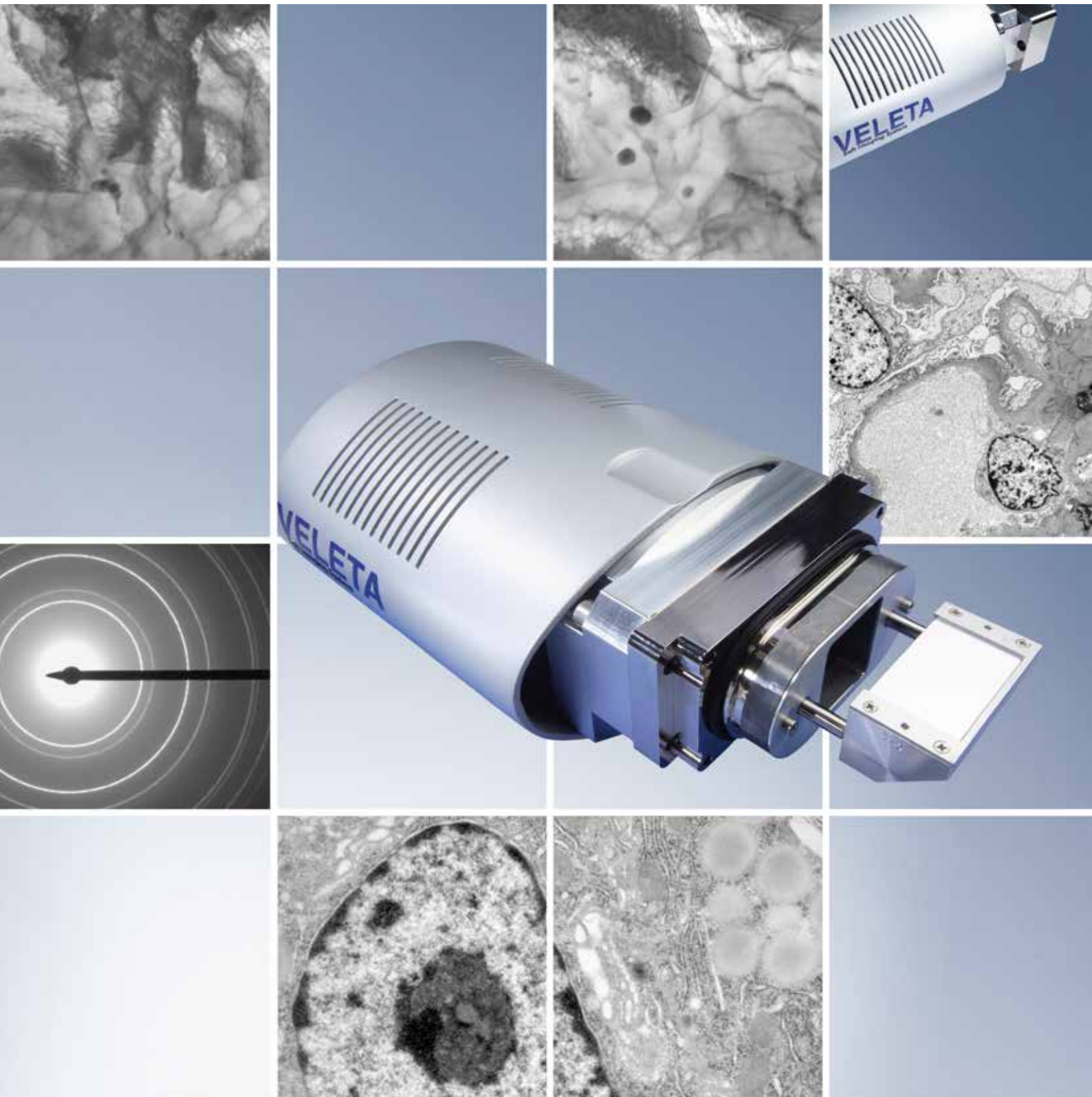
emsis

Digital Imaging Solutions

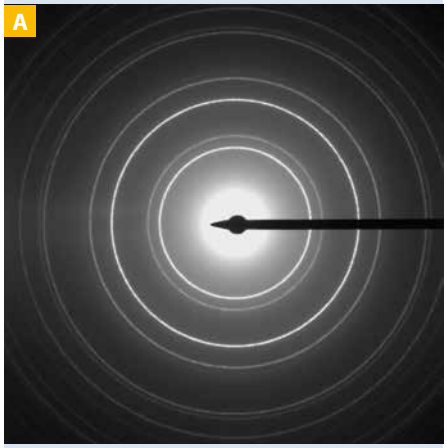
Veleta

TEM Camera Solutions

2k x 2k Side-Mounted TEM CCD Camera Solution



A



Diffraction image of aluminium

B

Liver cell-nucleus

C

Dislocations in a low-angle grain-boundary (aluminium)

VELETA - 2K X 2K SIDE-MOUNTED TEM CCD CAMERA SOLUTION

The Veleta is a side-mounted TEM camera offering a Peltier-cooled CCD chip with 2k x 2k pixels and a dynamic range of 14 bits. The Veleta reflects current life science, bio-medicine, materials science and industrial requirements. This new camera works perfectly in conjunction with our tomography software, iTEM Solution Tomography. The Veleta is another component of EMSIS's vision of "Electron Microscopy made simple."

The pneumatically driven Veleta can be mounted onto the wide-angle (35 mm) port of almost all common TEMs. With attributes such as an optimized scintillator and a highly sensitive chip, this camera system guarantees high dynamic range and high sensitivity. Even weak signals can be recorded. Frame rates of more than 19 frames per second at binning 4 make it viable to search and focus directly onscreen. A Fire-Wire™ interface is used for transferring data from camera to PC. The Veleta is fully integrated into iTEM, the TEM imaging platform. This means that the acquired images can be processed, evaluated, archived and documented - immediately and at the greatest of convenience.

Customized adapters

The camera system consists of a high yield phosphor screen, a prism to reflect the image onto the CCD sensor, as well as housing and a flange specific to each TEM. The rigidly coupled phosphor scintillator-lens-CCD combination is a fundamental prerequisite for ensuring optimum conditions for artifact-free shading correction.
The positioning of the phosphor screen inside the TEM is pneumatically driven.
X-ray safety is guaranteed up to 200 KeV.

Special lens

In a partnership with lens makers of the highest caliber, the Veleta camera system is equipped with a new specially-designed lens. In conjunction with its state-of-the-art CCD chip and even more efficient scintillators, the custom optics of the Veleta system ensures much greater sensitivity and light efficiency, as well as a signal-to-noise ratio higher than ever before.

CCD chip

The highly sensitive CCD chip used in the camera system provides a maximum resolution of 2048 x 2048 pixels with a 14-bit dynamic range. In conjunction with further dark-current-reduction measures, this increases detection efficiency of the entire camera system. The CCD sensor has uniquely high quantum efficiency that when combined with reduced dark current results in a tremendous increase of the camera system's total detection quantum efficiency (DQE).

CCD Cooling

Noise – known as "dark current" – is generally introduced into an image if the CCD chip is not cooled to a sufficiently low temperature. This effect is not a problem with the Veleta due to its sophisticated Peltier-cooling system. The temperature of the CCD chip is regulated at 10° C (@ 25° C ambient temperature). Noise is further suppressed by highly efficient read-out technology.

High frame rates

Frame rates of more than 19 images per second at binning 4 and of 5 images per second at full resolution are supported. Such high frame rates are ideal for locating suitable sample segments directly onscreen. In conjunction with the RTFFT (Real Time Fast Fourier Transformation), the focusing mode offers ideal assistance for setting various microscope parameters. This enables you to conveniently focus your sample on your PC screen as opposed to

Features
Up to 2048 x 2048 pixels
Peltier cooled
Lens coupled
14 bit

Applications
Tomography
Diffraction
Materials Science
Virology
Pathology
Digital Documentation

having to use the viewing screen of the microscope. No matter what mode you select, the Veleta offers excellent dynamic range and high sensitivity.

Binning
Binning modes help to increase camera sensitivity even more. The Veleta supports several binning modes: 2x, 4x.

Variable exposure times
The interline chip has an electronic shutter. The Veleta offers exposure times ranging from 1 ms to 100 s. This makes it possible to acquire images of intense illumination or of very low intensity.

High sensitivity
The Veleta's high sensitivity means samples can be observed on the monitor at beam intensities so low, users would usually not be able to see anything on the TEM viewing screen.

Anti-Blooming / Diffraction
The CCD chip's interline-transfer architecture guarantees high anti-blooming. Individual pixels are clearly delineated using the Veleta. In conjunction with extremely short exposure times, this optimizes the acquisition of diffraction images.

Optimized scintillators
The Veleta uses optimized and highly sensitive phosphor scintillators. In order to match customers' individual demands various scintillators can be customized to handle multiple accelerating voltages and applications.

FireWire™ technology
Data is transferred from the camera to the PC via FireWire™ (IEEE1394a) interface. This technology means the Veleta can be installed on any PC or laptop equipped with a FireWire™ port. No additional special frame grabber is necessary.

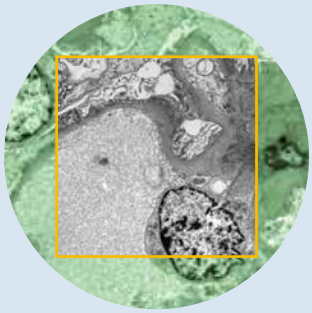
Real-time functions
Integration of the camera with iTEM and RADIUS, the EMSIS TEM imaging platforms, ensures real-time shading correction, intensity histograms, auto contrast adjustment and real-time Fast Fourier Transformation during image acquisition.

Integration
The integration of the Veleta with iTEM and RADIUS provides professional functions such as autofocus, labeling, processing, archiving, analyzing and report generation. Photographic quality printouts are available in seconds after acquisition.

Ideal for tomography
The Veleta works perfectly in conjunction with our tomography software, iTEM Solution Tomography.

D **Veleta**
2k x 2k side-mounted TEM camera

E **Field of View**
Frame shows Veleta's field of view within TEM fluorescence screen



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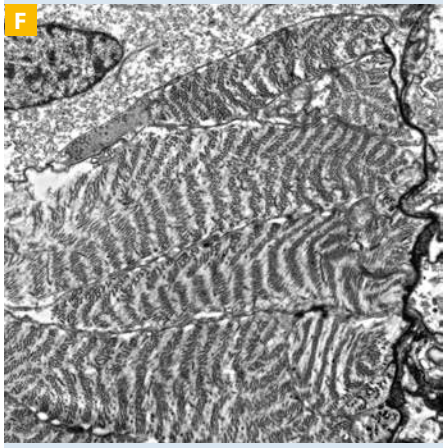


Muscle cell of a worm

Specifications

G Veleta

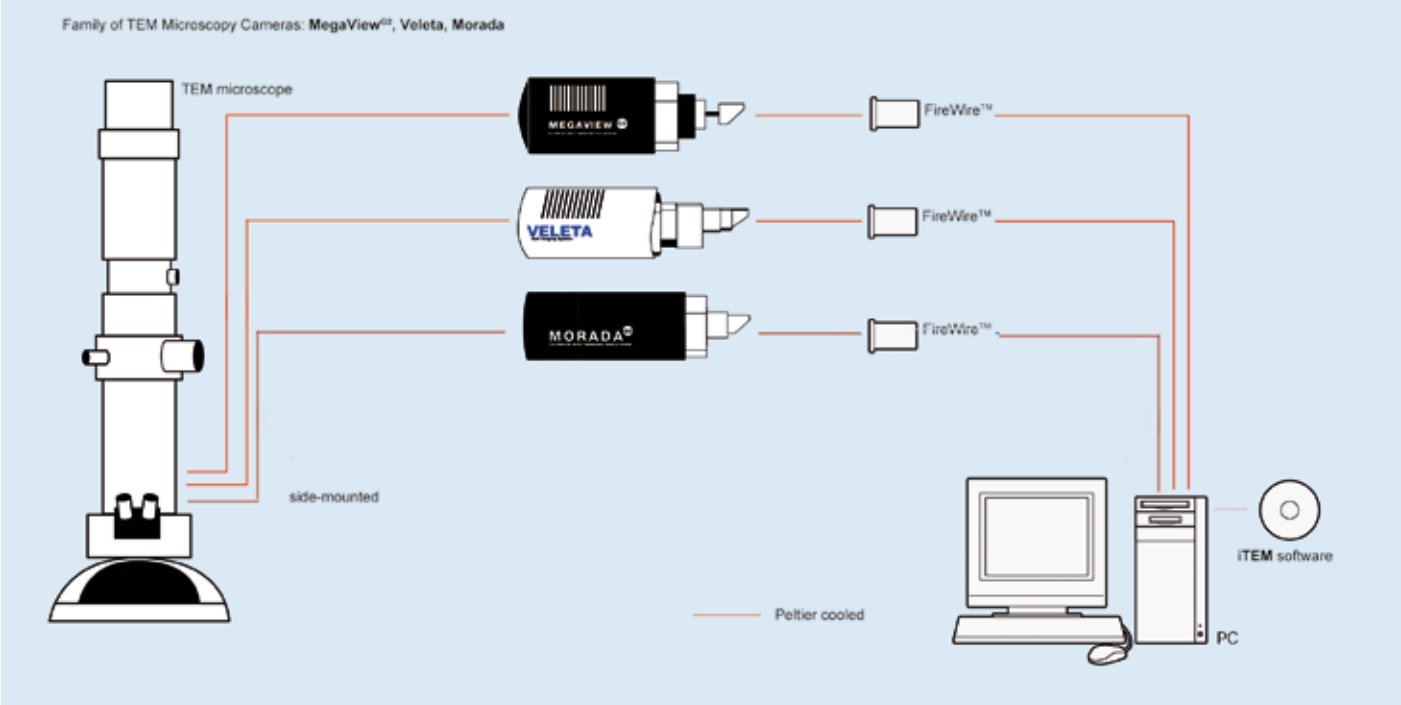
Chip type	16.67 x 16.67 mm interline CCD image sensor
Resolution (pixels)	2048 x 2048
Binning 2x (pixels)	1024 x 1024
Pixel size (µm²)	7.4 x 7.4
Effective pixel size (µm²)	13.1 x 13.1
Binning	2x, 4x
Pixel clock rate (MHz)	25
Frame rate (fps)	5 @ full resolution (14 bit)
Frame rate (fps)	> 19 @ binning 4
Digitization (bit)	14
Exposure time	1 ms - 100 s
Display	Full image in real time
Chip temperature	10° C @ 25° C ambient temperature
Camera mount	on wide angle port
Camera positioning	PC controlled pneumatic movement / control box
Anti blooming	> 300x
PC interface	FireWire™ (IEEE 1394a)
Camera coupling	Lens-optically coupled
Partial Readout	Yes
Full Well Capacity (e-)	40,000
Scintillator	High quality phosphor
CE certified	Yes
RoHS compliant	Yes

G Veleta

2k x 2k side-mounted TEM CCD camera

Made in Germany

System Diagram



Specifications are subject to change without any obligation on the part of the manufacturer.

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