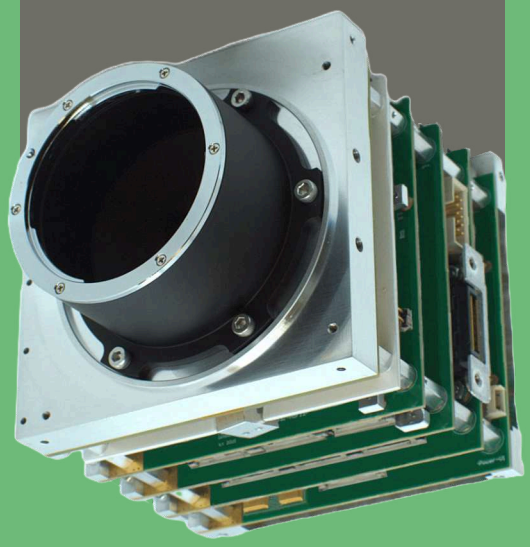
nüvü cameras

every photon counts

nüSpace

EMCCD BUILT FOR SPACE

BREAKING BARRIERS IN LOW LIGHT SPACE-BASED IMAGING



THE NEW STANDARD FOR SWaP-C CAMERA PAYLOAD

A FLEXIBLE EMCCD CAMERA DESIGNED TO FIT IN 1U

nüSpace

CHARACTERISTICS	SPECIFICATIONS
Size (H W D)[1]	Tailored to fit in < 1U
Mass[1]	< 1 kg
Power[2]	< 15 W
Thermal Vacuum Cycling (TVAC)	-35°C to 60°C and < 10^{-4} Torr
Random vibration testing	6.8 g RMS, 1 min/axis, 20-2000 Hz
Radiation tolerance	>15 kRad
Control & image interface	SMBX Connector Camera Link, GigE, CoaXpress
Imaging features	Binning, ROI, TDI, photon counting, HDR mode
Standard	
Environmental operation temperature	-35 °C to 60 °C

OUTSTANDING PERFORMANCES THANKS TO NÜVÜ'S PROPRIETARY TECHNOLOGIES

The nüSpace platform is an advanced imaging solution that brings Nüvü's specialized electronics to nanosatellites, drawing on designs created for NASA's Roman Grace space telescope. With exceptional sensitivity and customizable detectors plus integrated optics and interfaces, it supports ambitious new mission goals.

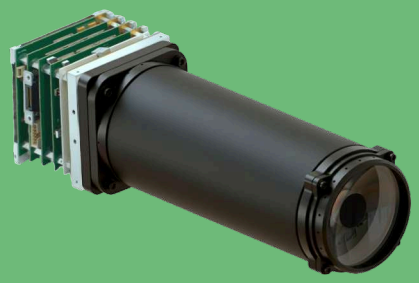
Potential applications :

- Earth observation
- SSA
- Space-based exoplanet imaging

FEATURES	BENEFITS
HDR readout mode	Improved dynamic range for better images during the day and the night

nüSpace EMCCD

The nüSpace EMCCD takes advantage of our patented technology in space for your most demanding applications. With its high TRL level achieved through multiple successful projects, it offers the highest standard for ultra low light applications in LEO and GEO CubeSats missions.



This camera is available with multiple EMCCD sensors:

nüSpace using Teledyne CCD201-20 EMCCD sensor

CHARACTERISTICS	SPECIFICATIONS
Operation frequencies[4]	10 MHz horizontal frequency 800 kHz vertical frequency
Imaging area	1024 x 1024 pixels 13 x 13 µm pixel area 13.3 mm x 13.3 mm effective area
Operating temperatures[5]	-135 °C to 60 °C
Frame rate[6]	1024 x 1024 pixels, 8.5 fps
Readout noise[6]	60 ē
Linearity	99%
Clock-induced charges[7]	0.0015 ē/pixel/frame
Dark current[7]	0.00007 ē/pixel/s @ -85°C
EM gain	1-5000
Spectral range	250-1100 nm
Data format	16 bits FITS images available

With optics

CHARACTERISTICS	SPECIFICATIONS
Swath	
GSD	
FOV	
Aperture	

Figure 1

Left: Night time nüSpace EMCCD ground image at starlight conditions taken with Nüvü's proprietary Time Delay Integration (TDI) mode of 1 second and with EM gain; Right: Day time ground image

QUANTUM EFFICIENCY

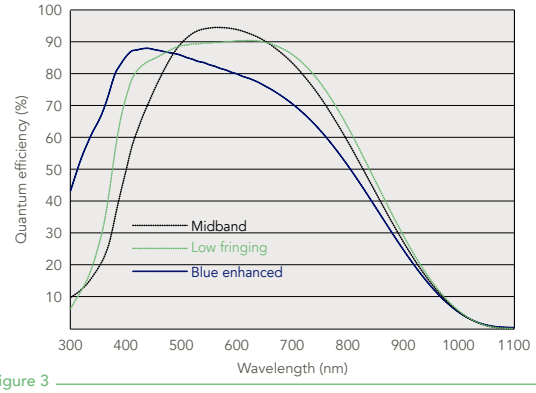


Figure 3

Typical spectral response as a function of wavelength, as specified by the EMCCD detector manufacturer[8]

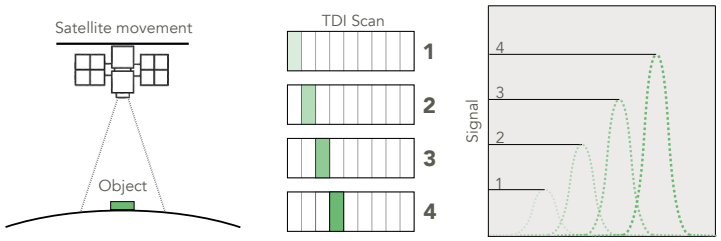
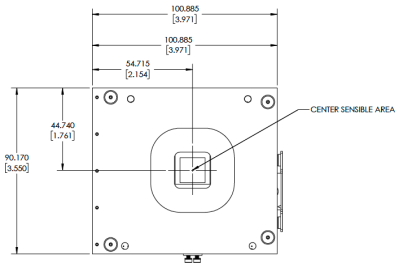


Figure 2

TDI readout scheme

TECHNICAL DRAWINGS[1]



1 Shown with mechanical housing. Housing can be removed and/or modified.
2 Measured at 1 FPS.
4 More clock speeds available upon request.
5 As per the EMCCD detector manufacturer's data sheet. Other configurations may exist.
6 Typical values measured at horizontal frequency 10 MHz, vertical frequency 800 kHz and unitary EM Gain. These numbers may vary depending on the EMCCD detector.
7 Typical values measured at horizontal frequency 10 MHz, vertical frequency 800 kHz and EM Gain 1000. These numbers may vary depending on the EMCCD detector.
8 Nüvü gives only the specifications of the EMCCD detector's manufacturer for grade 1 sensors (e.g. Quantum efficiency, aesthetic specifications, blemishes).

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nüSpace Specification Sheet 3.0.2