crystal SPACE

Name	MONITORING CAMERA "SUUPISTRI"	MONITORING CAMERA "KODAS"	NANOSATELLITE CAMERA "KIKAS" (CAM1U)
Crystalspace code	CS-152	CS-151	CS-101
Market	• Satellites • Rovers • Landers etc.	• Satellites • Rovers • Landers etc.	• Cube satellites • Nanosatellites
Applications and use cases	• Computer vision in Space • Monitoring of mission critical events • Monitoring of separation and landing • Monitoring & controlling rover robotic arms, drills, etc. • Stereo cameras	• Computer vision in Space • Monitoring of mission critical events • Monitoring of separation and landing • Monitoring & controlling rover robotic arms, drills, etc. (Moon project Maxar/NASA) • Stereo cameras (Moon project Maxar/NASA)	• Short missions on LEO up to 4 years • Monitoring mission critical events • Low-cost, good quality PR images
Overview	Crystalspace camera "Suupistri" brings the new level of capabilities to space - ideal for monitoring & computer vision applications. It is the smallest and the most advanced satellite monitoring camera on the market. Suupistri enables robotic & docking missions to get 720p quality feed at 60 fps.	Monitoring camera system "Kodas" is the best option for monitoring non-real-time operations. Some applications for Kodas monitoring cameras are: monitoring satellite deployables and their performance, monitoring separation and landing, as well as taking images for marketing and mission promotion purposes.	Nanosatellite cameras are the smallest and the most advanced CubeSat camera systems on the market. It suits well for densely packed CubeSats. Some of the use cases are: taking high quality images for PR purposes as well as monitoring satellite panels deployments.
Imaging sensor	5 MP 12-bit visual wavelength - monochrome or RGB Other sensors upon request	5 MP 12-bit visual wavelength - monochrome or RGB	5 MP 12-bit visual wavelength - monochrome or RGB
Mass	500 g	330 g	50 g
Dimensions	82 x 88 x 39 mm	82 x 88 x 39 mm	42 x 25 x 45 mm
Working distance	100 mm to ∞	100 mm to ∞	100 mm to ∞
Field of View	Different lenses available from 12° to 120° diagonal.	Different lenses available from 12° to 120° diagonal.	Different lenses available from 12° to 120° diagonal.
Supported communication protocols	• 200 Mbit SpaceWire • 1Gbit Ethernet • SpaceFibre (Upon request)	• RS-485 • RS-422 • RS-232 • CAN • 100 Mbit Ethernet (upon request)	• UART • RS-485 • RS-422 • CAN
Power consumption	Nominal power consumption 1.5 W with peaks of 4 W during imaging & compression	Nominal power consumption 0.5 W with peaks of 2 W during imaging	Nominal power consumption 75 mW with peaks of 750 mW during imaging and compression
Lead time	Contact us for more info!	Contact us for more info!	Contact us for more info!
RAW Framerate with full resolution	• 14 fps (@RAW 5MP format) over 1Gbit Ethernet • 3 fps (@RAW 5MP format) over Spacewire • 14 fps (@RAW 5MP format) to long term memory	• 1/60 fps (@RAW 5MP format) over UART/RS-xxx @ 3Mhz • 1 fps (@ RAW 5MP format) to long term memory	• 1/60 fps (@RAW 5MP format) over UART/RS-xxx @ 3Mhz • 1 fps (@ RAW 5MP format) to long term memory
Video feed	• 720p - 60fps - over ethernet OR save to long term memory • 1080p - 50fps - over ethernet OR save to long term memory	• 480p - 15fps - over ethernet OR save to long term memory • 720p - 7fps - over ethernet OR save to long term memory • 1080p - 3fps - over ethernet OR save to long term memory	• 480p - 15fps - save to long term memory • 720p - 7fps - save to long term memory • 1080p - 3fps - save to long term memory
5 MP RAW Image size	7.5 MB	7.5 MB	7.5 MB
Framerate improvement	Possible to achieve higher fps with in-camera compression, windowing or binning	Possible to achieve higher fps with in-camera compression, windowing or binning	Possible to achieve higher fps with in-camera compression, windowing or binning
Available compression algorithms	• JPEG • bitbacking • Zipping • Others based on request such as H.264	• JPEG • bitbacking • Zipping	• JPEG • bitbacking • Zipping
Long term memory	200 RAW 5MP images	150 RAW 5MP images	150 RAW 5MP images
Power input	9...36V DC (Unregulated)	9...36V DC (Unregulated)	3.3V DC
Compatible with illumination unit	Yes	Yes	No
Baffle available	Yes	Yes	No
Global shutter available	Yes	No	No
ESA certified assembly	Yes	Yes	
Applicable standards	ECSS NTSS	ECSS NTSS	
Auto gain	Yes	No	No
Auto exposure	Yes	No	No
Operating temperature range	-60...80°C (extended ranges with heating upon request)	-40...80°C	-40...60°C
Storage temperature range	-100...125°C	-40...125°C	-40...125°C
Total ionizing Dose	• 20 krad • 40 krad • 100 krad	~20 krad	~10 krad