

Malin Space Science Systems

Exploration Through Imaging

ECAM-C50/M50

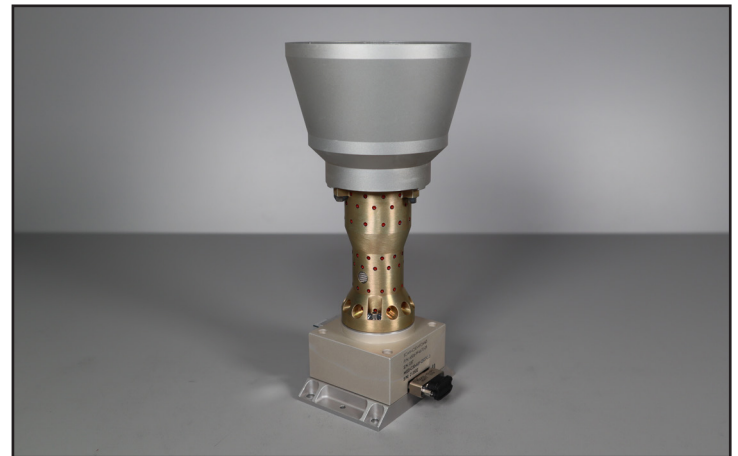
Color/Monochrome CMOS Camera, Rolling Shutter,
2592x1944, 2.2µm pitch

Electro-Optical	
Band	Visible
Color Band	M50: Monochrome C50: RGB Bayer Color Filter
Wavelength Range	350-750 nm (mono) 400-500 nm (blue) 500-575 nm (green) 575-750 nm (red)
Peak QE	>62% at 500nm (mono)
Electronic Shutter Modes	Rolling
Pixels	5.0 Mpixel
Horizontal Resolution	2592 pixels
Vertical Resolution	1944 pixels
Pixel Pitch	2.2 µm
Array Diagonal	7.2 mm
Conversion Bit Depth	12 bit
Temporal Noise	9 e-
Full Well	7,000 e-
Dynamic Range	57.8 dB
Frame Rate, Native Format	2.8 fps (200 Mbit/s SpW)

Power	
Supply Voltage	5V (4.5 to 5.25V)
Power, Idle	1 W
Power, Imaging	1.6 W

Thermal	
Operating Temperature	-30 to +40 °C
Protoflight Qualification	-40 to +55 °C
Non-Operating Temp.	-50 to +70 °C
Temperature Sensing	Internal ISL71590 available for readout on J1

Survivability	
Radiation Design Environment	5 years GEO (up to 15 years GEO optional)
Predicted MTTF	7.9 million hours
NASA TRL	9



ECAM-C50/M50

Features

- Compact and low power
- Standardized ECAM interface

Applications

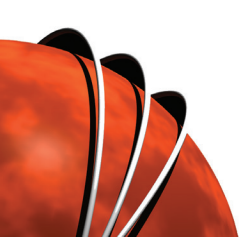
- Orbital rendezvous and proximity operations (RPO)
- Star navigation
- Natural Feature Tracking (NFT)
- Space Situational Awareness (SSA)

Programmability

- SpaceWire Rate
- Sensor Clock Rate
- Companding Table
- Gain
- Integration
- Offset
- Region of Interest
- Frame Rate
- Row/Column Skipping
- Binning
- Test Patterns

Optics			
Effective Focal Length	F/#	FOV (V° x H°)	Bandpass
3.85 mm	F/3.5	62 x 80	400-700 nm
7.1 mm	F/3.5	33 x 44	400-700 nm
12.6 mm	F/3.5	19 x 25	400-700 nm
29.7 mm	F/3.0	8 x 11	400-700 nm
63 mm	F/3.7	4 x 5	400-700 nm

Digital	
Internal Memory	64 byte SpW Rx FIFO 512 byte SpW Tx FIFO No Frame Buffer
Digital Processing	12 to 8 bpp Companding (Table Lookup)
Data Interface	SpaceWire (Single Port) 100 or 200 MBit/s

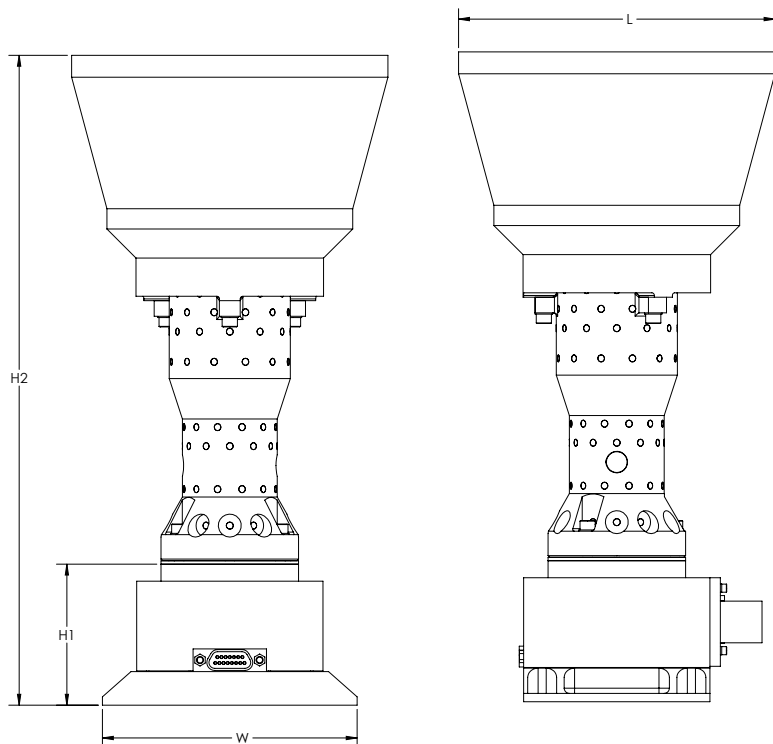


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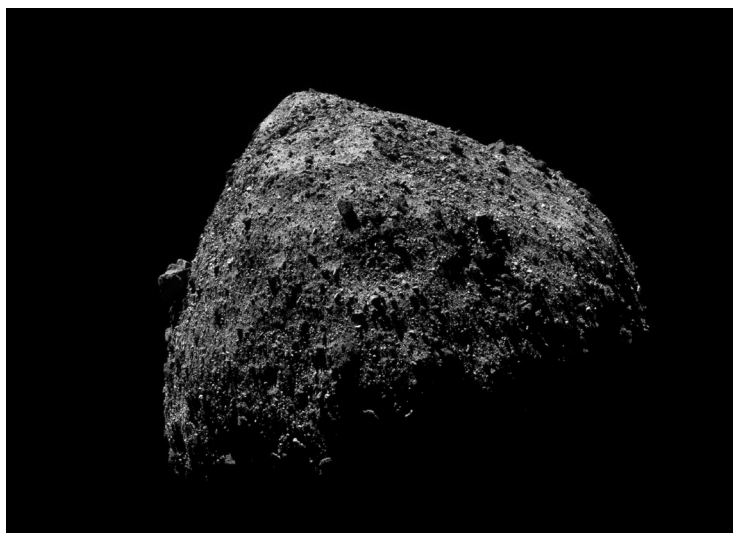
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Dimensional Envelope, Typical Optics with Baffle

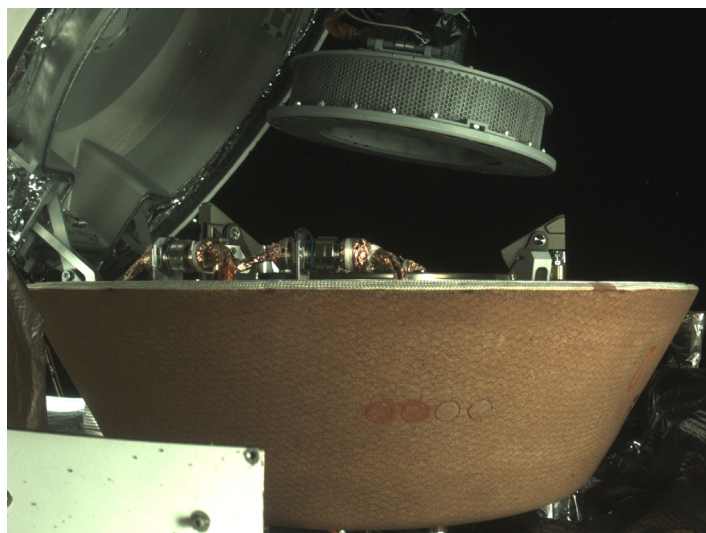


Mechanical/Interfaces	
Mass w/typical optics, & baffle	590 g
Dimensional Envelope w/typical optics, & baffle	L: 97 mm W: 78 mm H1: 43 mm H2: 198 mm
Connectors	J1: Micro-D, 15-Socket ECAM Pinout



Benu after Orbital B Insertion

This image was taken from a distance of 690 m above the asteroid's surface by NavCam1 (ECAM-M50), one of three navigation cameras that comprise the spacecraft's TAGCAMS (the Touch-and-Go Camera System) suite. At this distance, details as small as 0.5 m across can be resolved in the center of the image. Credit: NASA/Goddard/University of Arizona/Lockheed Martin



NASA's OSIRIS-REx

This StowCam (ECAM-C50) image shows the collector head hovering over the SRC after the Touch-And-Go Sample Acquisition Mechanism (TAGSAM) arm moved it into the proper position for capture. StowCam, a color imager, is one of three cameras comprising TAGCAMS (the Touch-and-Go Camera System), which is part of OSIRIS-REx's guidance, navigation, and control system. Credit: NASA/Goddard/University of Arizona/Lockheed Martin

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