Malin Space Science Systems

Exploration Through Imaging

Lander Vision System Camera (LCAM)

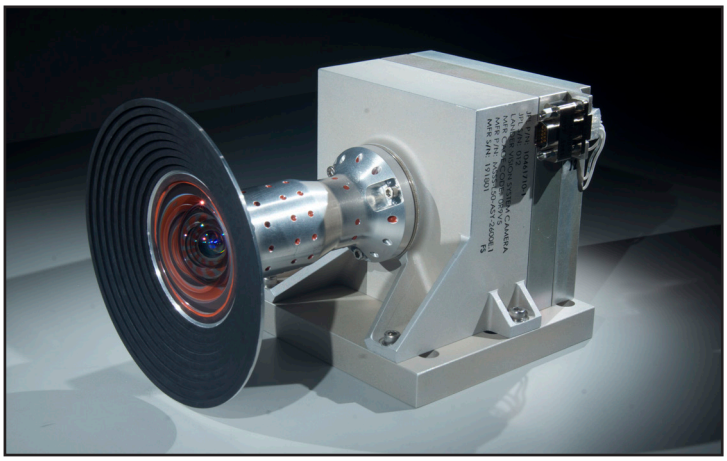
Color/Monochrome ChannelLink CMOS Camera, Global Shutter, 2592x2048, 4.8µm pitch

Electro-Optical	
Band	Visible
Color Band	Monochrome or RGB Bayer Color Filter
Wavelength Range	350-850 nm (mono) 400-515 nm (blue) 485-595 nm (green) 575-550 nm (red)
Peak QE	>57% at 550nm (mono)
Electronic Shutter Modes	Global
Pixels	5.3 Mpixel
Horizontal Resolution	2592 pixels
Vertical Resolution	2048 pixels
Pixel Pitch	4.8 µm
Array Diagonal	15.9 mm
Conversion Bit Depth	10 bits
Temporal Noise	14 e-
Full Well	10,000 e-
Dynamic Range	57.1 dB
Frame Rate, Native Format	12 fps
Optics	5.8mm EFL, F/2.7 [90 x 113 deg FOV] (also compatible with P50/ L50 lens options)

Power	
Supply Voltage	5V (4.5 to 5.5V)
Power, Idle	4 W
Power, Imaging	5.5 W

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

Survivability	
Radiation Design Environment	5 years GEO standard, up to 15 years GEO optional



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Features

- Imaging for autonomous surface descent navigation
- Terrain Relative Navigation (TRN)
- ChannelLink interface

Programmability

- Sensor Clock Rate
- Gain
- Integration
- Region of Interest
- Frame Rate
- Test Patterns
- Automatic Exposure Control

Optics			
Effective Focal Length	**F/#**	**FOV (V° x H°)**	**Bandpass**
5.8 mm	F/2.7	90 x 109	425-675 nm
7 mm	F/5.6	78 x 96	425-675 nm
9 mm	F/5.6	60 x 74	425-675 nm
12.6 mm	F/5.6	44 x 56	425-675 nm
22 mm	F/5.6 or F/3.5	26 x 32	425-675 nm

Digital	
Internal Memory	64 byte SpW Rx FIFO 512 byte SpW Tx FIFO 32 GB NAND Flash (Non-Volatile)
Digital Processing	2x2 Summing
Data Interface	Command/Housekeeping: LVDS Asynchrous Serial Video: ChannelLink Trigger: LVDS Discrete

PO Box 910148 - San Diego CA, 92191-0148 - (858) 552-2650 x200 - cameras@msss.com

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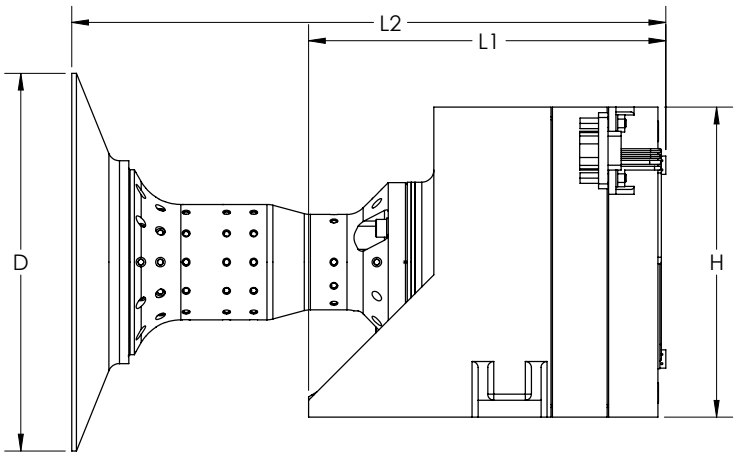
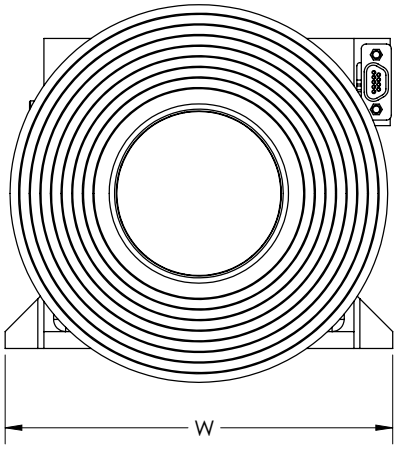
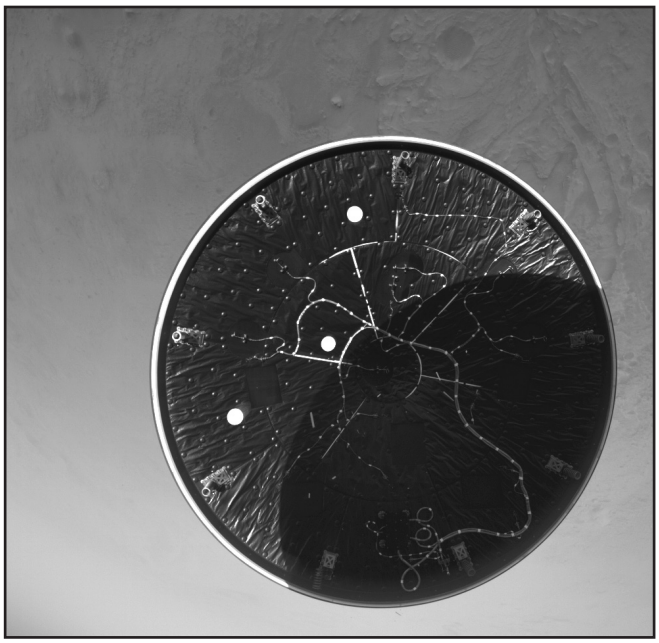
Dimensional Envelope, 5.8 mm Optics and Sunshade





Mechanical/Interfaces	
Mass w/5.8 mm optics and sunshade	880 g
Dimensional Envelope w/5.8 mm optics and sunshade	H: 82 mm W: 102 mm L1: 94 mm L2: 156 mm D: 100 mm
Connectors	J1 (power/data): Micro-D, 25-Socket J2 (thermal): Micro-D, 9-Socket



The heat shield drops away toward Mars after being released from the Mars 2020 back shell during the spacecraft's descent through the Martian atmosphere on Feb. 18, 2021. This image was taken by the rover's Lander Vision System Camera (LCAM), serving as part of the Terrain-Relative Navigation system.

Credit: NASA/JPL-Caltech/MSSS

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