sodern
arianeGROUP

AURICAM

MULTI-PURPOSE RAD-TOLERANT CAMERA

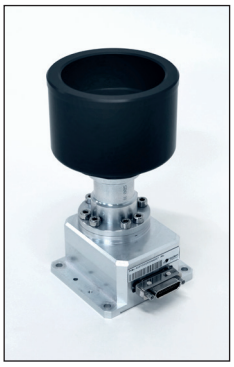
OFF-THE-SHELF CAMERA WITH ECSS CLASS 1 EEE PARTS

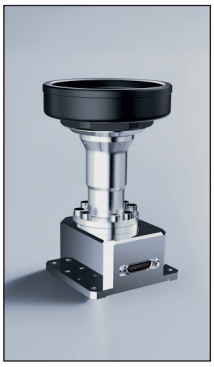
AUTO-EXPOSURE AND IMAGE CORRECTION FEATURES

RADIATION HARD DESIGN FOR 10 YEARS IN LEO AND 15 YEARS IN GEO

AURICAM LINE UP

OPTICAL HEAD (OH)

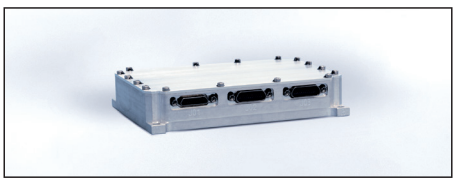


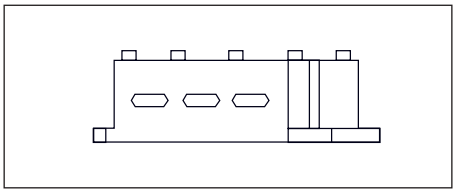


- **4MPx image resolution**
- Visible, black and white or color (on request)
- **3 fields of views**
- **Baffle for straylight protection and optimum SNR in all conditions**
- Electronic level 1, rad-hard optics
- High throughput interface, up to 160Mbps

			
	D35	D80	D8
Field of view	35° diagonal (25° square)	80° diagonal (57° square)	8° diagonal (5,7° square)
Size	80 x 80 x 140 mm	90 x 90 x 135 mm	71 x 65 x 155 mm
Mass	420g	450g	< 550g

ELECTRONIC UNIT · **OPTIONAL**



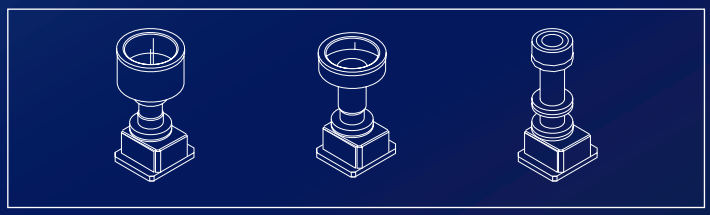


- 5V power supply
- Drives up to 2 cameras through SpaceWire interface

Size	91 x 117 x 25 mm
Mass	315 g
Power consumption	2.4W/PU + 2W/OH (BOL)

AURICAM FEATURES

AURICAM INCLUDES ADVANCED PROPRIETARY FIRMWARE, OFFERING HIGH CONTROL AND FLEXIBILITY



HIGH THROUGHPUT INTERFACE

Auricam SpaceWire communication link operating at 20,40, 80 or 160Mbps addressable through a SpaceWire router

FLEXIBLE IMAGE FORMAT

Image format adaptable to your needs:

- Pixel depth of 8, 10 or 12 bits
- 2x2 or 4x4 binning
- Windowing with up to 5 Regions of Interest
- Row and Band Sampling

IMAGE DATING

<1ms accurate time-stamp

AUTO-EXPOSURE

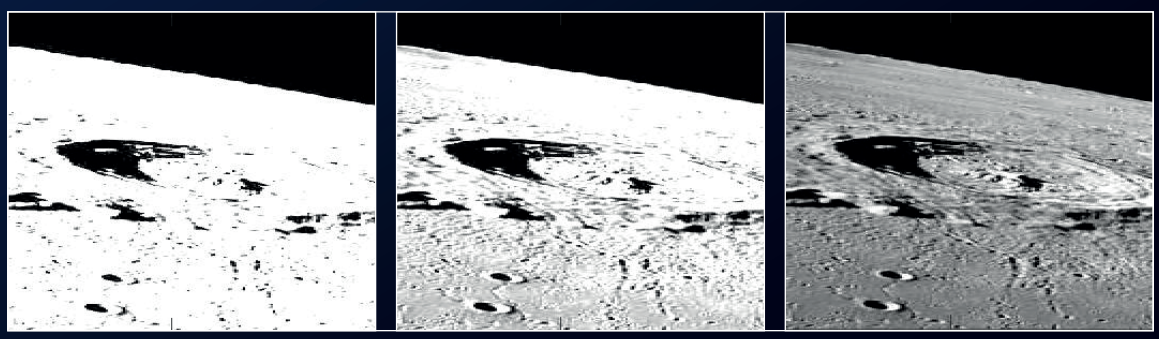
Auricam can be used with:

- manual setting of exposure time
- full auto-exposure time

providing balanced images regardless of lighting conditions or scene dynamics.

ON-BOARD IMAGE CORRECTION

- Built-in sensor noise reduction feature
- High frequency spatial noise correction
- Optical distortion correction



Auto-exposure example

AURICAM MAIN CHARACTERISTICS

- Compact and lightweight design
- Several fields of view available (D35, D80, D8 on request)
- Aperture and focus can be adapted on request
- Optional EGSE and OGSE
- Camera Numerical Model available for realistic simulation
- Accurate calibration available
- Expert technical support available
- 4Mpx CMOS sensor
- EU Dual Use 6A003.b.5 – ITAR Free

END-OF-LIFE WORST CONDITIONS DATA

CAMERA PERFORMANCE

			
	D35	**D80**	**D8**
Diagonal Field of View	35°	80°	8°
Focal length	25 mm	10 mm	114 mm
Pixel angular resolution	44”	112”	11”
Fixed Aperture	F/3.5 (standard); F5.6; F/8	F/4 (standard); F5.6; F/8	F/6.3
Sun Exclusion Angle	38°	64°	45° (TBC)
End of life detection capability – for a quasi-static target – SNR>5	Magnitude 6 – 8	Contact us	
Resolution capability	20cm @ 1km / 2m @10km	50 cm @1 km 5m @ 10 km	5cm @1km 48 cm @10 km

SENSOR CHARACTERISTICS

	D35	D80	D8
Resolution	2048 x 2048 pixels – 5.5 µm pitch		
Shutter type	Global shutter		
Programmable Integration time	[60 µs – 30 s]		
Image type	Black & White (Standard) or Color (on request)		

ELECTRICAL AND COMMUNICATION INTERFACES

	D35	D80	D8
Interface	SpaceWire (up to 160 Mbps)		
Power supply	4.6 to 6 V		
Power consumption	2W		
Memory	2 x 512Mb SDRAM embedded		
Frame rate	Full frame, 12 bits: 2,5 fps / 2x2 binned: 10 fps		

ENVIRONMENTAL CHARACTERISTICS

	D35	D80	D8
Qualification operating range	-35 to +55 °C (baseplate temp.)		
Qualification non-operating range	-45 to + 60°C (baseplate temp)		
Storage temperature	-45 to +80 °C		
Mechanical first resonance frequency	> 600 Hz		
Vibration (random)	14.1 gRMS in plane 21.8 gRMS out of plane	12 gRMS in plane 21.8 gRMS out of plane	14.1 gRMS in plane 21.8 gRMS out of plane

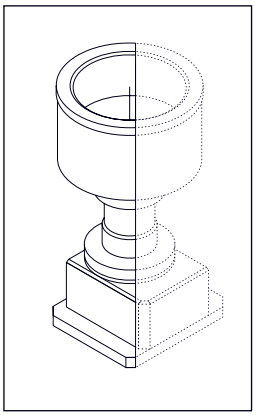
RELIABILITY, AVAILABILITY AND LIFETIME

	D35	D80	D8
EEE quality grade	ECSS class 1 for Flight Model / Industrial grade for Engineering Model		
Lifetime	10 years in LEO / 15 years in GEO		
Reliability	<119 FITS @25°C		

AURICAM OPTIONS

A full set of options to support your design,
verification and operational needs

AURICAM NUMERICAL MODEL - SOFTWARE LIBRARY

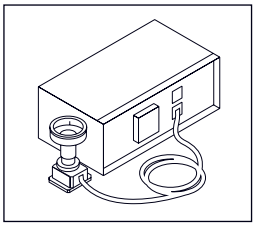


Enhance your simulation and validation workflow with our Camera Numerical Model. The AURICAM numerical model simulates realistic images, considering:

- All detector noises and sequencing effects
- Optical distortion
- Intra and inter pixel sensitivity
- Straylight effects
- PSF
- Protons

The model includes a star catalog, into which you can input your 3D models

ELECTRONIC GROUND SUPPORT EQUIPMENT



EGSE is available to drive Auricam for all your test needs.

CAMERA ACCEPTANCE TEST PLAN

We can adapt Auricam Acceptance tests to best suit your specification – from minimum performance tests for optimal cost, to full environmental and performance characterization.

TECHNICAL SUPPORT

Any questions about Camera use or performance ?
Our experts are here to help ! We offer several support options:

- Remote technical support
- Mission-specific Radiation and Performance assessment
- Additional technical support on demand
- Customization

Should you have any specific needs, we can help find the best cost-performance trade-off.

CONTACT US AT **SALES-DEPARTMENT@SODERN.FR**

AURICAM PRODUCTION AND HERITAGE

PRODUCTION FACILITY

All AURICAM environmental and performance tests are performed in-house. Sodern's test facilities include:

- Geometrical test bench for characterization of optical distortion
- Optical response characterization benches
- High-accuracy Straylight test facility
- Thermal vacuum chambers
- Vibration table

Whether you're looking for cost-effective minimum performance tests or comprehensive environmental and performance characterization, we propose a flexible approach to ensure that your camera meets the highest standards of quality and reliability.

UNMATCHED EXPERTISE IN STAR TRACKERS AND HIGH-PERFORMANCE CAMERAS

Our decades of experience in designing and manufacturing star trackers and high-performance cameras set us apart. Auricam enjoy the benefits of feedback from:

- **Auriga™** Star Tracker with 1400+ Units flying and 40+ millions hours of successful operation
- Navigation camera of JUICE mission: currently on its way to Jupiter
- High performance **Narrow Angle Camera** of the Earth Return Orbiter (ERO) spacecraft

2023 cnes esa

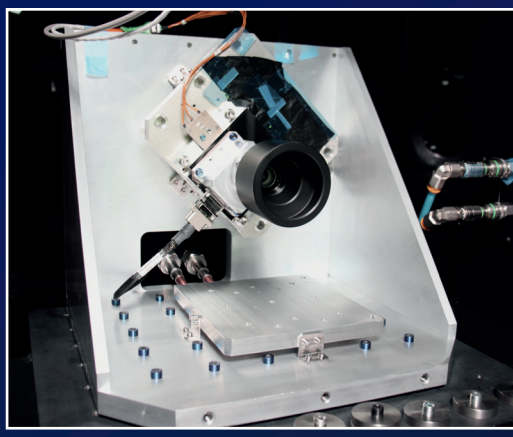
JUICE

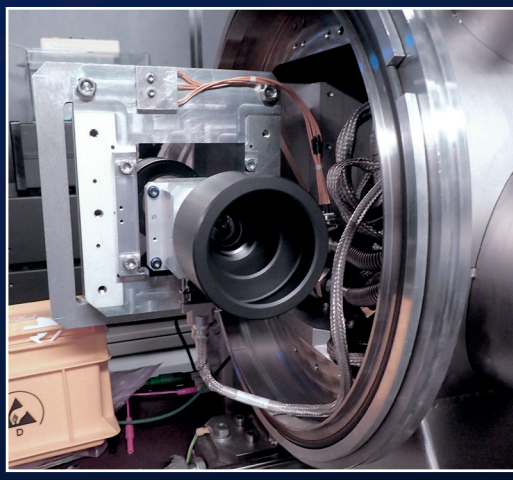
Development & production of the Juice NavCam Navigation Camera.

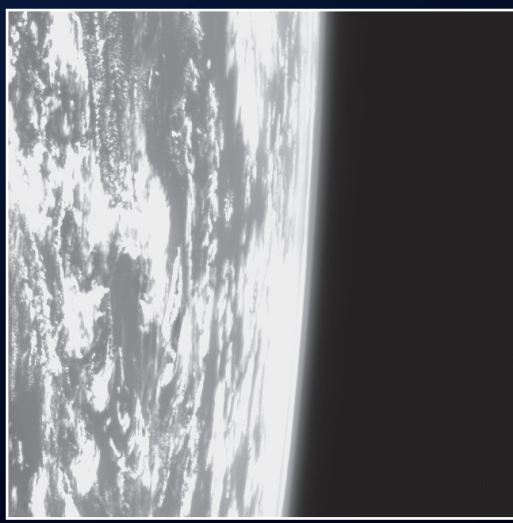
2025 cnes esa

EARTH RETURN ORBITER (ERO)

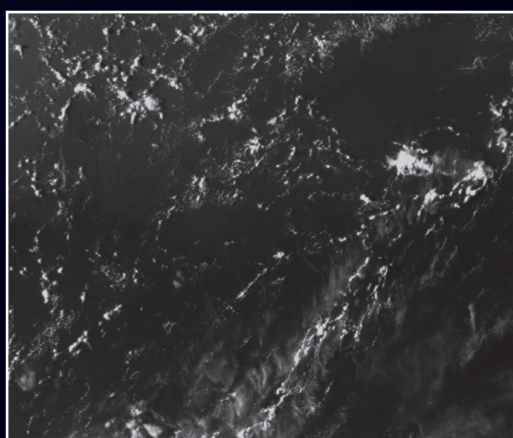
Development & production of the Narrow Angle Camera for ESA's Earth Return Orbiter of the MSR (Mars Sample Return) mission.







↕ Images of the Earth taken by the JUICE NavCam during the Earth flyby in August 2024



THEY WORKED WITH US

We chose Sodern for their undeniable expertise in space-grade camera development. From pre-development to production, their attentive support and tailored solutions ensured our project's success.
The trust and seamless communication from the start were invaluable.
We are confident that our future collaborations will be equally successful.

Thales Alenia Space expresses its satisfaction with the Sodern team's flexibility in adapting to its specific requirements, the excellent support provided throughout the entire project, and the timely delivery of the AURICAM camera.

We are available to discuss your business needs and mission requirements, provide pricing and technical proposals :

CONTACT US: SALES-DEPARTMENT@SODERN.FR

20 avenue Descartes
94450 Limeil-Brévannes
France

SODERN.COM