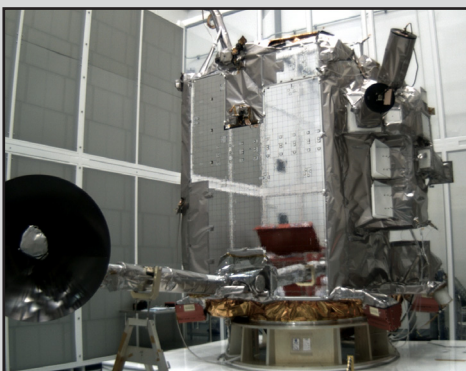


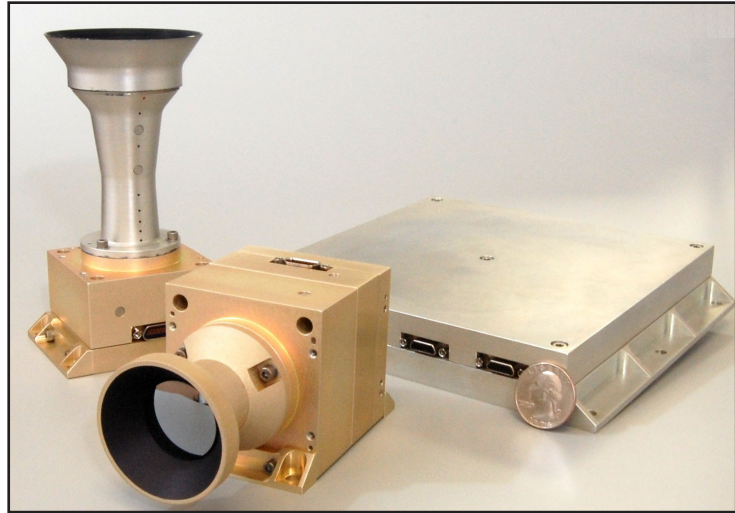
### Features

- Acquire multi-megapixel still images and high-definition video
- Operate multiple cameras with a single spacecraft interface
- Color CMOS, Monochrome CMOS, and IR camera options
- Small, lightweight cameras ease accommodation
- Data recording, pre-processing, compression, and playback handled by DVR
- Three standard lens options, or request a custom design
- 8GB, 16GB, or 32 GB non-volatile image buffer
- Radiation-tolerant design
- Configurable mounting adaptors



ECAM-C30 image of Lunar Reconnaissance Orbiter High-Gain Antenna test

### ECAM Imaging System



Visible and IR Cameras with 4-Port Digital Video Recorder

The ECAM Imaging System minimizes spacecraft overhead and flexibly delivers the features, performance, and reliability required to service a variety of applications, including:

- In-flight engineering diagnostics
- Deployment/actuator monitoring
- Space situational awareness
- Science observations
- Public outreach

Leveraging the experience of more than a dozen science instruments delivered to deep space that have returned more than 700,000 images, the ECAM imaging system delivers cost-effective, short lead-time, high-performance, and reliable space imaging as a modular off-the-shelf solution.

Each system starts with one or more Digital Video Recorders (DVR). DVRs support up to eight cameras, and multiple DVRs may be linked to support additional cameras without requiring additional spacecraft data interfaces. The spacecraft commands the DVR to record snapshots or video from a given camera at a specified time. The DVR commands the selected camera, pre-processes and compresses the data, and stores the data to a non-volatile memory buffer (available with 8, 16, or 32 GByte buffers).

The DVR can playback recorded images and video upon command.

Command sequences can also be pre-programmed for automatic execution when power is applied, reducing spacecraft overhead and allowing the DVR to operate in a stand-alone mode.

Select any combination of ECAM-series cameras to meet the needs of your mission:

- **ECAM-C50**  
5 Megapixel (2592 x 1944) Color CMOS Camera
- **ECAM-M50**  
5 Megapixel (2592 x 1944) Monochrome CMOS Camera
- **ECAM-C30**  
3 Megapixel (2048 x 1536) Color CMOS Camera
- **ECAM-IR1**  
384x288 Uncooled Microbolometer LWIR Camera



Example IR1 Image with Thermal False Color

Select one of three off-the-shelf optics (narrow, medium, and wide field-of-view), or let us design custom optics to meet your specific needs.

Our standard optics have no moving parts, are athermalized to provide stable performance over a wide range of temperatures, and are built to withstand the hazards of launch and long-term operation in orbit.

Select mounting adaptors for one of three configurations.

The spacecraft data interface may be configured for Spacewire or any custom serial interface definition,



**MSSS FACTS**

Headquarters: **San Diego**  
 Type: **Small Business**  
 Quality: **ISO9001:2008 Compliant**  
 DUNS Number: **62-680-9032**  
 CAGE Code: **0R9V5**  
 NAICS Codes: 333316, 336419, 541512, 541690, 541712, 927110

Version: 20130506  
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Parameter	ECAM-C50	ECAM-DVR4
Mass (without optics)	256 g each	1110 g each
Dimensions	78(W) x 58(L) x 44(H) mm	183(W) x 157(L) x 32(H) mm
Power Consumption	1.75 W (idle) 2.5 W (imaging)	9.75 W (idle) 13.5 W (imaging)
Focal Plane	CMOS, 5 Megapixel (2650 x 1944 pixels)	
Wavelength range	400 nm 750 nm	
Imaging modes	Monochrome or RGB using Bayer Pattern Filter	
Narrow FOV Optic	FOV 25°(H) x 19°(V): Focal Length 12.6 mm; f/3.5	
Medium FOV Optic	FOV 44°(H) x 35°(V): Focal Length 7.1 mm; f/3.5	
Wide FOV Optic	FOV 77°(H) x 55°(V): Focal Length 4.7 mm; f/3.5	
Frame size	Full 2650 x 1944, WQXGA 2560 x 1600, QXGA 2048x1536, HD1080p 2048x1080, HD720p 1280x720, VGA 640x480	
Frame rates	Full 3 frame/s, WQXGA 3.5 frame/s, QXGA 2.5 frames/s, HD1080p 4 frames/s, HD720 8 frames/s, VGA 20 frames/s	
On-board Storage (DVR)	8, 16, or 32 GBytes	
Image Compression (DVR)	JPEG (Lossy), First-Difference Huffman (Lossless)	
Data Interface	Spacewire (to DVR)	Spacewire, LVDS, RS-422
Design Life	Nominal 10 year (radiation determined)	
Radiation Dose	5 years (GEO)	
Recommended Operating Temperature	-30°C to 40°C	-45°C to 60°C