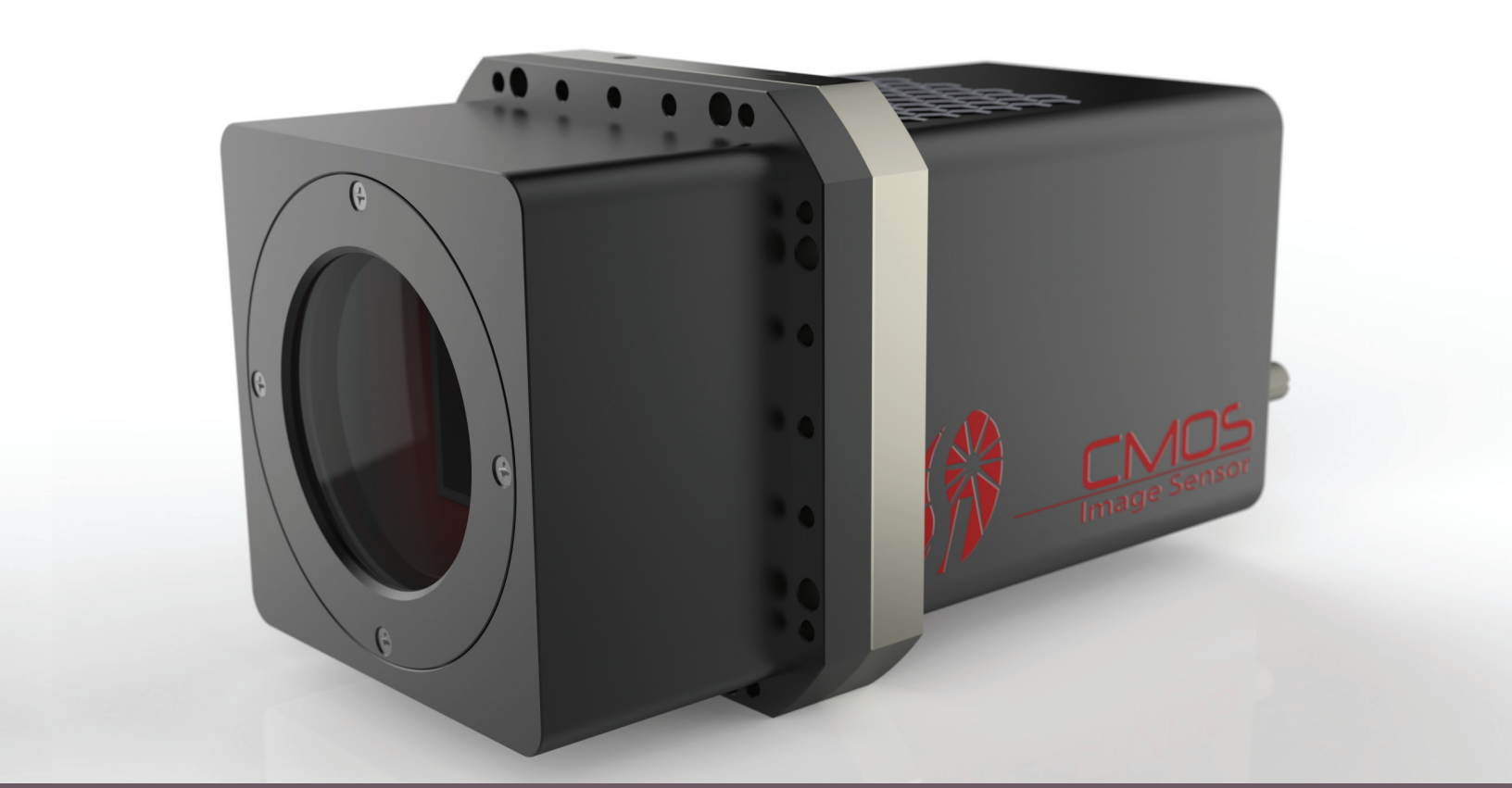
1600S CMOS Cameras



CMOS Scientific Cameras

brought to you from the leader in

CCD Scientific Cameras

Spectral Instruments, the industry leader in CCD scientific cameras, expands their offering to include a revolutionary new cooled CMOS scientific camera platform. The CMOS camera platform provides:

- Fast electronic shuttering, moderate read out speed, low read noise
- Large area, front and back illuminated, high Q.E. sensors
- Sensitive to visible, UV, X-ray radiation, and electrons
- Radiation tolerant camera and sensors
- Configurations include optical windows, fiber optic tapers or faceplates, and bare, windowless sensors
- Custom designs for OEM applications

Spectral Instruments Inc.

1600S CMOS Cameras

Extending our commitment to the development and production of high performance scientific imaging systems, Spectral is pleased to introduce a new camera platform series, the 1600S, that has been expressly designed to accommodate a variety of large area, large pixel CMOS sensors.

The physical size and format of the 1600S is based upon our prior 1000S CCD cameras that were designed for high performance in a compact package. The basic 1600S accommodates sensors to a 40mm x 40mm image size. For larger sensors, the 1600S EX platform accommodates sensors of up to 60 x 60 mm size (See CMOS Image Sensor table below for a matrix of available sensors).

The selected sensors are designed for accurate measurements in scientific applications. They are typically back illuminated, and are optimized for detection of electrons, x-rays, UV, or visible light depending on the backside surface treatment. Some are radiation hardened, some are optimized for extremely fast electronic shuttering. Some utilize on-chip A/D converters, some use off-chip converters. New sensors are added to the selection as needed which is possible by the flexibility of the 1600S architecture.

The input configuration of the 1600S system is changeable depending on the requirements of the experiment. A vacuum compatible flange is fitted for electron and soft x-ray measurements. Optical windows of various materials and with AR coatings optimized for the application are common. Fiber optic faceplates or tapers are bonded to the sensor for coupling to scintillators and phosphors. We routinely alter both the optical and mechanical front end configuration of our camera systems to adapt to the customer's needs.

The 1600S offers moderate frame rates by using a 1Gbit fiber optic link to the HTTP Camera Server, and a 1Gbit Ethernet connection from the server to host computer. This makes a simple, reliable, easy to implement camera connection that requires no camera drivers, and makes it possible to operate the camera from a variety of computer types and operating systems without the use of exotic camera interface hardware. Maximum frame rate for a 2K x 2K size image sensor is approximately 10 FPS.

The camera and most of the available sensors are radiation tolerant to at least 50 krad TID, and are intended for use in severe environments including high EMP and vacuum environment without requiring an air "bubble". The system is optimized for dump and read measurements where the sensor dumps charge until an event trigger, then integrates signal for a predetermined time interval and reads. The trigger circuitry is optimized for fast response and low jitter using either optical fiber or electrical inputs.

The sensor in the 1600S camera is thermoelectrically cooled. The degree of cooling depends on several factors, including size of sensor, whether it is fiber optic coupled, and required dark current for the application. In general, the sensor operating temperature will be in the -10°C to -50°C range. Waste heat is removed by liquid recirculator for best performance, but forced air cooling is an option at reduced cooling performance.

Spectral's SI Image software can be used to control camera parameters such as subarray size and binning, trigger arming, setting integration time, etc. It is also used to acquire, save display and analyze images using a straightforward graphical interface. Alternately, socket level programming can be used to develop a custom software solution using the HTTP camera server interface.

CMOS Image Sensor

Sensors available for the 1600S Platform

Sensor	Pixel Size	Pixel Format	Pixel Type	HDR	Shuttering	Illumination	Digitization	Noise (e^-)	Full Well (e^-)	Features
CIS-12	6.5 µm	4K x 4K	5T	Yes	Fast global/ rolling	Backside only	Off Chip	5	200k	Very fast global shutter
CIS-31	6.5 µm	8K x 8K	5T	Yes	Fast global/ rolling	Backside only	Off Chip	5	200k	Very fast global shutter
CIS-46	11 µm	2K x 2K	5T	Yes	Rolling, fast clear	Front or back	On Chip	2	80k	Lower cost
CIS-54	10 µm	4K x 4K	5T	Yes	Global/ rolling	Front only	Off Chip	4	150k	Random row and column addressing

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