Camera tests results

Prosilica gc1350, gc1380, ge1380

JAI TM-2040, BM-141

PhotonFocus MV1-D1312-40, MV1-D1312-80

Prosilica GC 1380

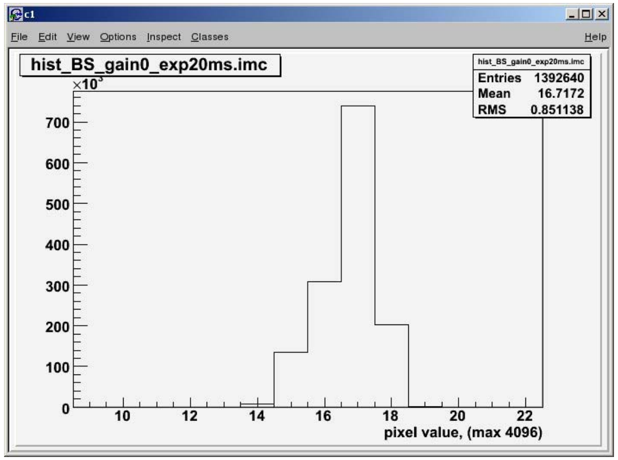
Features:

- Gain: 0 to 27 dB
- Black level control: Auto
- Minimal shutter: 10 us
- Chip size: 1360x1024
- Pixel size: 6.45

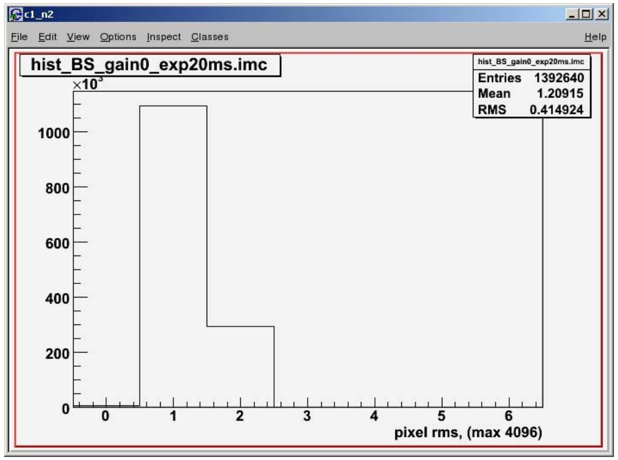
Problems:

- Not controllable BL

Black frame mean value



Black frame rms value



Prosilica GC 1350

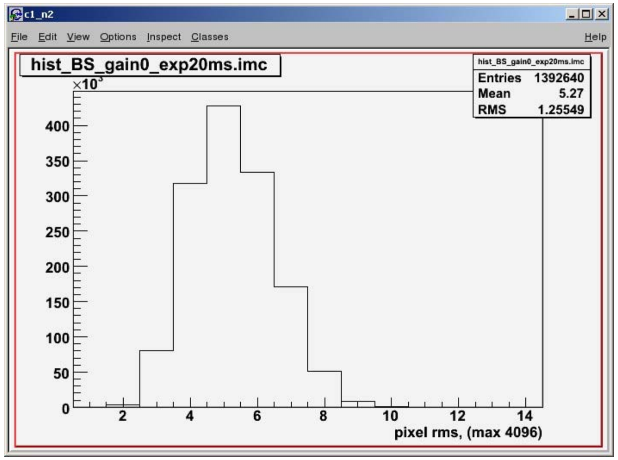
Features:

- Gain: 0 to 25 dB
- Black level control: Auto
- Minimal shutter: 10 us
- Chip size: 1360x1024
- Pixel size: 4.65

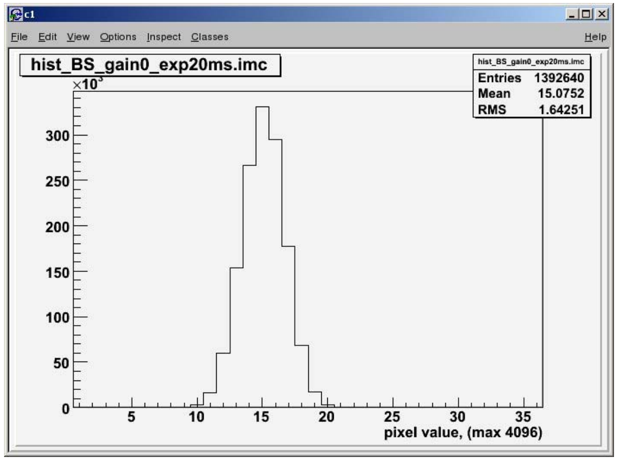
Problems:

- Not controllable BL

Black frame mean value



Black frame rms value

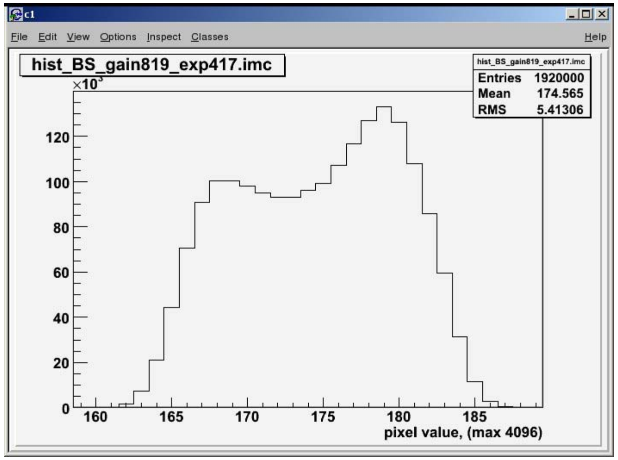


JAI 2040

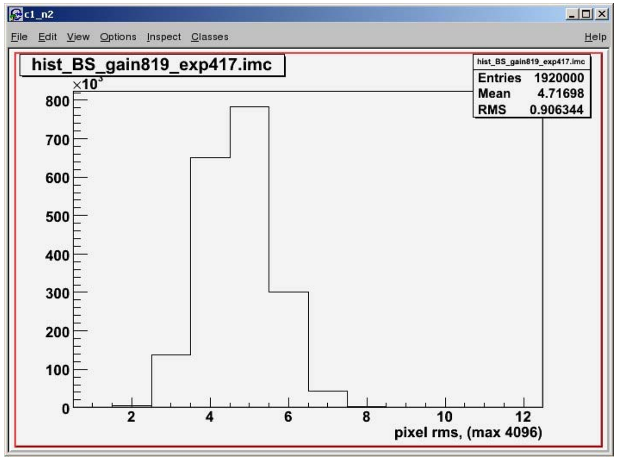
Features:

- Gain: -3 to 12 dB
- Black level control: Manual
- Minimal shutter: 13 us
- Chip size: 1600x1200
- Pixel size: 7.4
- Two readout channels

Black frame mean value



Black frame rms value



JAI BM-141

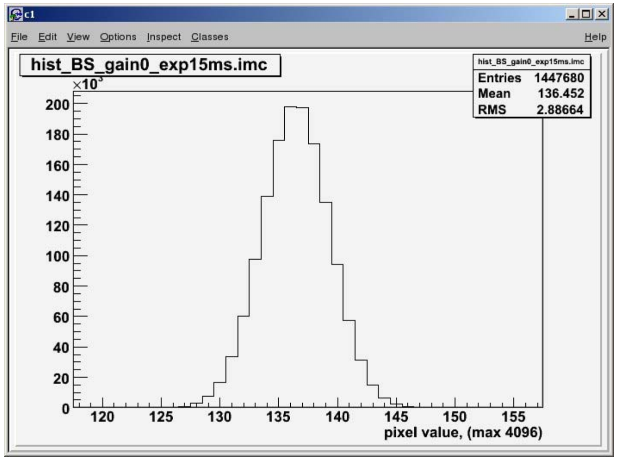
Features:

- •Gain: -6 to 24 dB
- •Black level control: Manual
- •Minimal shutter: 63 us, step 63us
- •Chip size: 1360x1024
- •Pixel size: 6.45

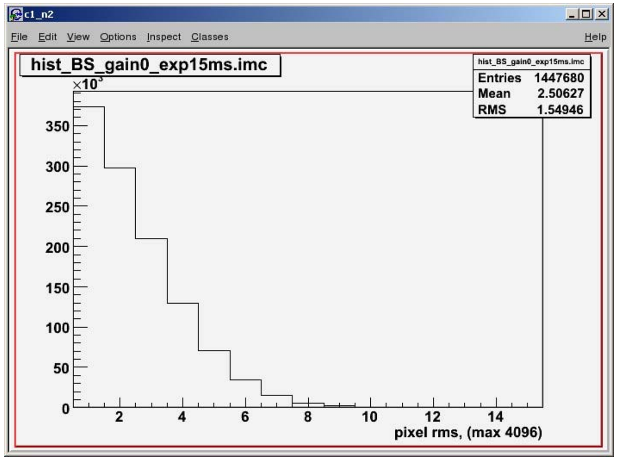
Problems:

- Camera arrived broken

Black frame mean value



Black frame rms value



Prosilica GE 1380

Features:

•Gain: 0 to 31 dB

•Black level control: Auto

•Minimal shutter: 10 us

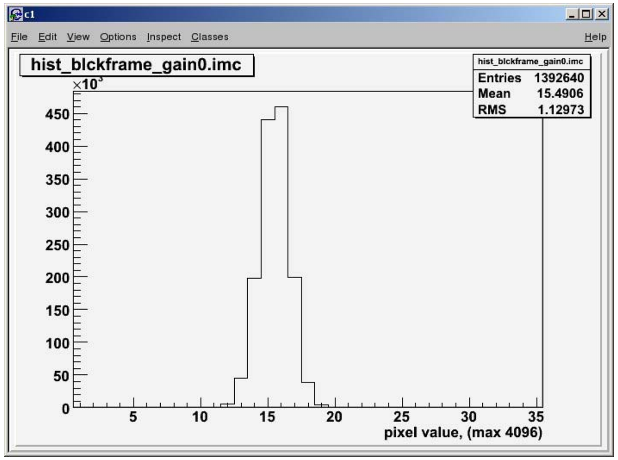
•Chip size: 1360x1024

•Pixel size: 6.45

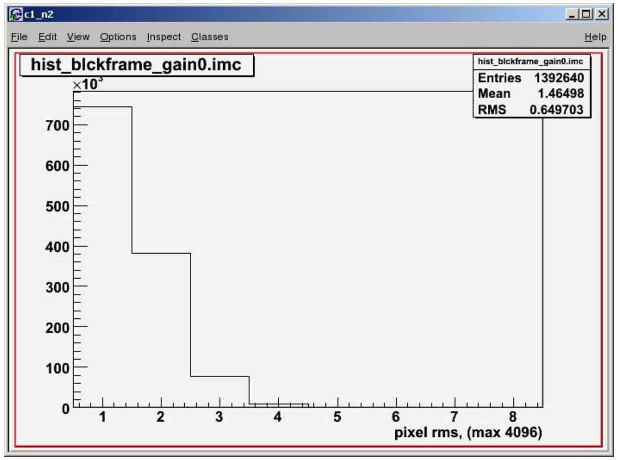
Problems:

• Not controllable BL

Black frame mean value



Black frame rms value



PhotonFocus MV-D1312-40 (CMOS)

Features:

•Gain: No gain

•Black level control: Manual

•Minimal shutter: 10 us

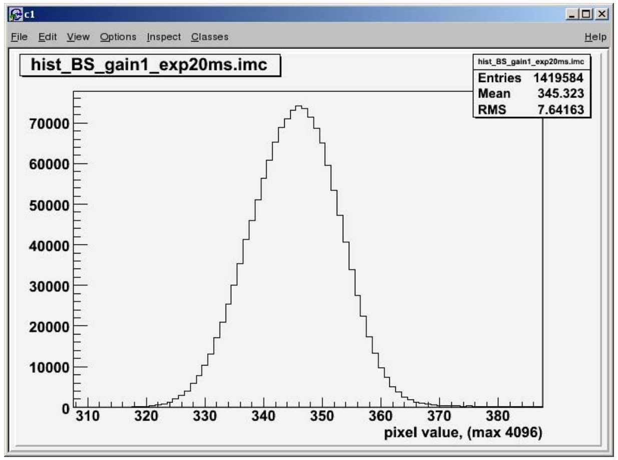
•Chip size: 1312x1080

•Pixel size: 8.0

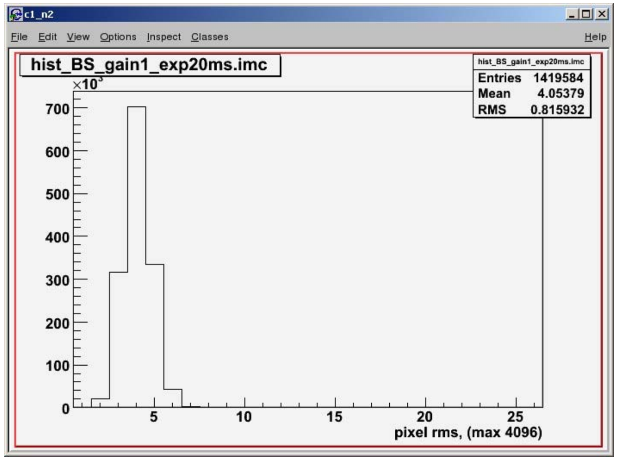
Problems:

• No analog gain, wide noise distribution

Black frame mean value



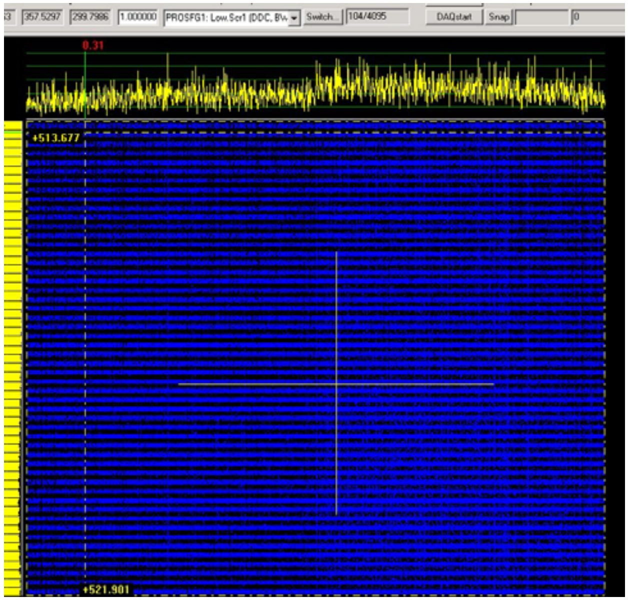
Black frame rms value



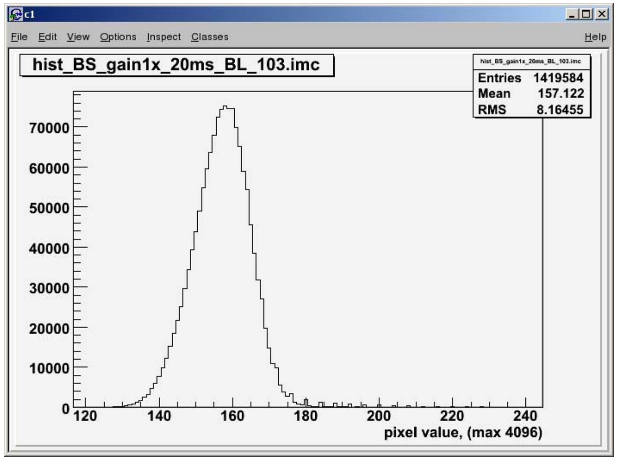
PhotonFocus MV-D1312-80 (CMOS)

Features:

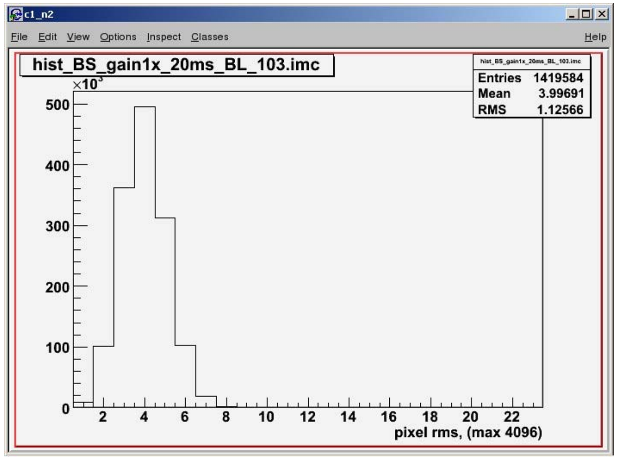
- Gain: No gain
- Black level control: Manual
- Minimal shutter: 10 us
- Chip size: 1312x1080
- Pixel size: 8.0



Black frame mean value



Black frame rms value



Summary

	Prosilica gc1350	Photonfocus-D1312-40	Prosilica gc1380	JAI TM-2040	JAI BM-141	Prosilica gc1350	Prosilica ge1380	Prosilica gc1350	Photonfocus-D1312-80
Resolution	1360x1024	1312x1082	1360x1024	1600x1200	1360x1024	1360x1024	1360x1024	1360x1024	1312x1082
Pixel size	4,65	8	6,45	7,4	6,45	4,65	6,45	4,65	8
Noise, a.u.	15,08±5,27	345,39±4,05	16,72±1,21	174,56±4,72	136,45±2,5	14,7±3,85	15,49±1,46	14,5±4,57	157,3±4
Sensitivity, a.u.	14,87±0,15	7,32±0,02	18,55±0,14	9,52±0,08	28,88±0,27	14,73±0,3	19,9±0,25	14,50±0,14	7,56±0,02
Black level	Auto	Manual	Auto	Manual	Manual	Auto	Auto	Auto	Manual
Gain	0÷25 dB	No gain	0÷31 dB	-3÷12 dB	-6÷24 dB	0÷25 dB	0÷31 dB	0÷25 dB	No gain
Gain Linearity									
Overall									

	Best
	Worst

Where there are equivalent models, such as GC1380 and GE1380, there is very little difference between the GC-Series and the GE-Series.

For most cases, where there is a GC-Series equivalent, the GC-Series camera should be chosen over the GE-Series. The GC-Series are less expensive, smaller, and lighter weight while having all the performance of the equivalent GE-Series cameras. With the GC-Series you get all the performance at a lower cost, smaller size, and lower weight.

The main differences between equivalent GC-Series and GE-Series cameras are as follows:

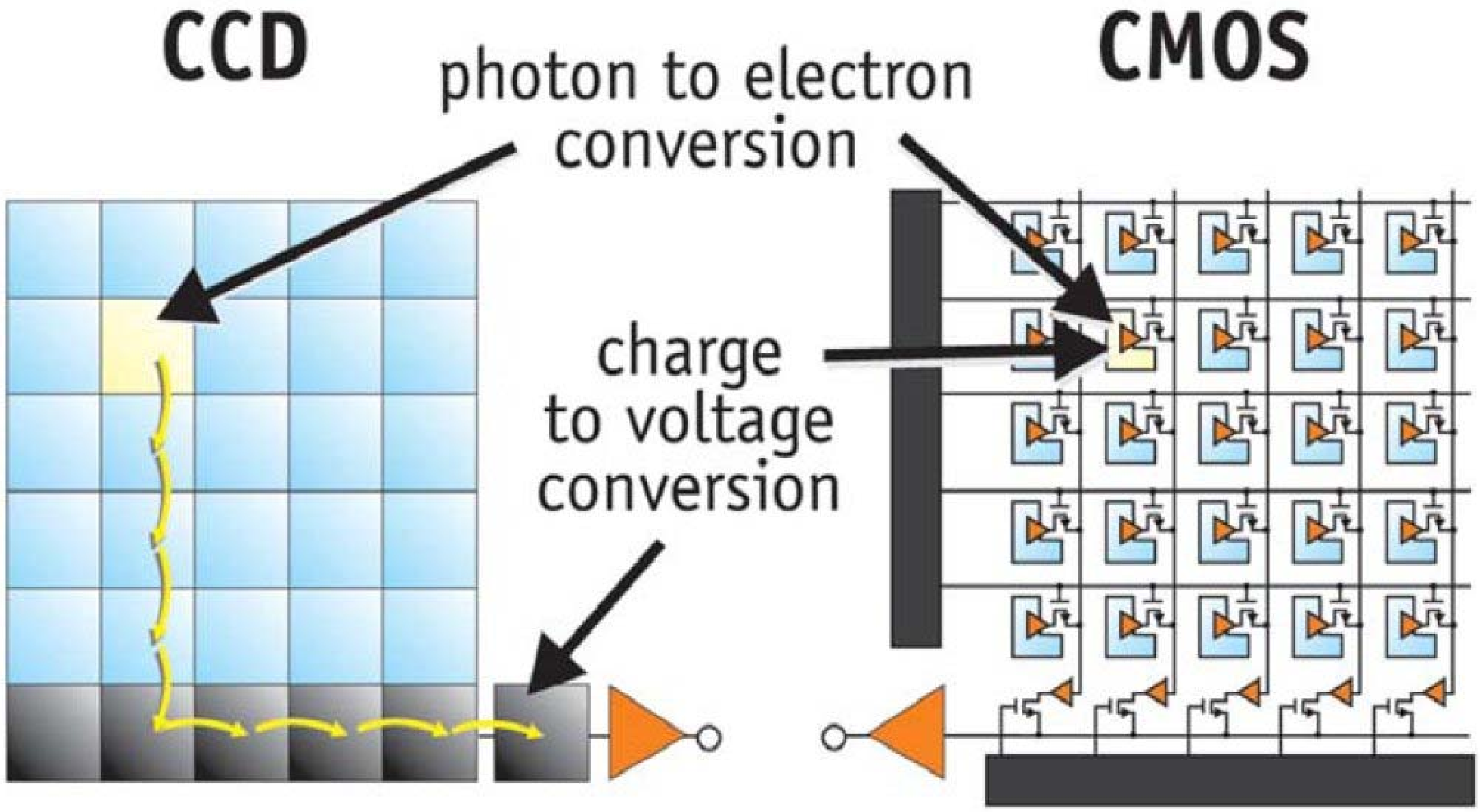
(a) The GE-Series has mini-SMB connectors to supply additional trigger/sync connections. The GC-Series also has trigger/sync connections, but these are located on a 12-pin hirose connector.

(b) The GE-Series has twice the on-board system memory. In most cases, there is no advantage to having additional system memory (except for when using the StreamHold or Recorder functions).

(c) The GC-Series has video-type auto-iris capability that does not currently exist on the GE-Series.

Otherwise, the GC-Series and GE-Series are functionally identical where there are equivalent models

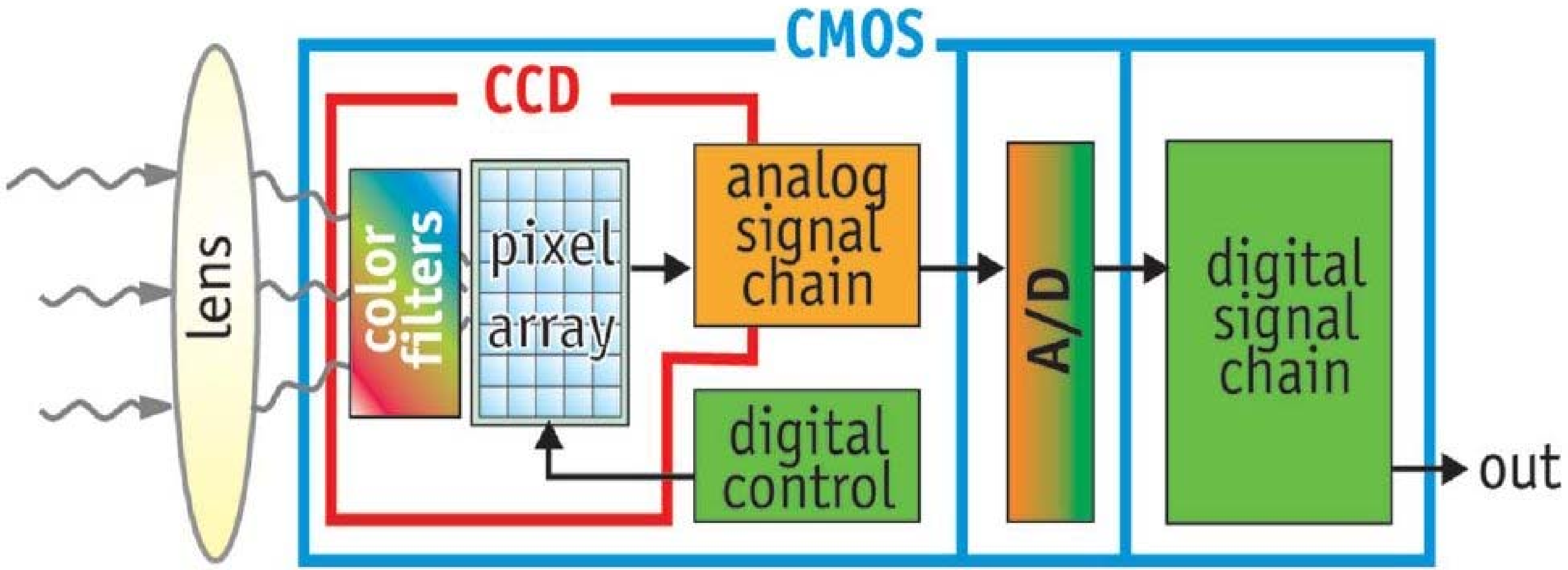
CMOS vs. CCD



CCDs move photogenerated charge from pixel to pixel and convert it to voltage at an output node. CMOS imagers convert charge to voltage inside each pixel.

CMOS vs. CCD

CMOS imagers can be fabricated with more “camera” functionality on the chip. This offers advantages in size and convenience



CMOS vs. CCD

Initial Prediction for CMOS	Twist	Outcome CMOS vs. CCD
Equivalence to CCD in imaging performance	Required much greater process adaptation and deeper submicron lithography than initially thought	High performance available in both technologies today, but with higher development cost in most CMOS than CCD technologies
On-chip circuit integration	Longer development cycles, increased cost, trade-offs with noise, flexibility during operation	Greater integration in CMOS than CCD, but companion ICs still often required with both
Reduced power consumption	Steady progress for CCDs diminished the margin of improvement for CMOS	CMOS ahead of CCDs
Reduced imaging subsystem size	Optics, companion chips and packaging are often the dominant factors in imaging subsystem size	Comparable
Economies of scale from using mainstream logic and memory foundries	Extensive process development and optimization required	Legacy logic and memory production lines are commonly used for CMOS imager production today, but with highly adapted processes akin to CCD fabrication

CMOS vs. CCD

Feature	CCD	CMOS
Signal out of pixel	Electron packet	Voltage
Signal out of chip	Voltage (analog)	Bits (digital)
Signal out of camera	Bits (digital)	Bits (digital)
Fill factor	High	Moderate
Amplifier mismatch	N/A	Moderate
System Noise	Low	Moderate
System Complexity	High	Low
Sensor Complexity	Low	High
Camera components	Sensor + multiple support chips + lens	Sensor + lens possible, but additional support chips common
Relative R&D cost	Lower	Higher
Relative system cost	Depends on Application	Depends on Application

Performance	CCD	CMOS
Responsivity	Moderate	Slightly better
Dynamic Range	High	Moderate
Uniformity	High	Low to Moderate
Uniform Shuttering	Fast, common	Poor
Uniformity	High	Low to Moderate
Speed	Moderate to High	Higher
Windowing	Limited	Extensive
Antiblooming	High to none	High
Biasing and Clocking	Multiple, higher voltage	Single, low-voltage