

Dynamisk område (Dynamic Range)

Definition på dynamisk område: meget enkel & elegant!

Forholdet mellem billedinformation og støj = billedinformation/støj

Table 1a

Photons	Noise	Signal-to-noise Ratio
9	3	3
100	10	10
900	30	30
10000	100	100
40000	200	200
90000	300	300

Tabellen viser det enkle forhold:

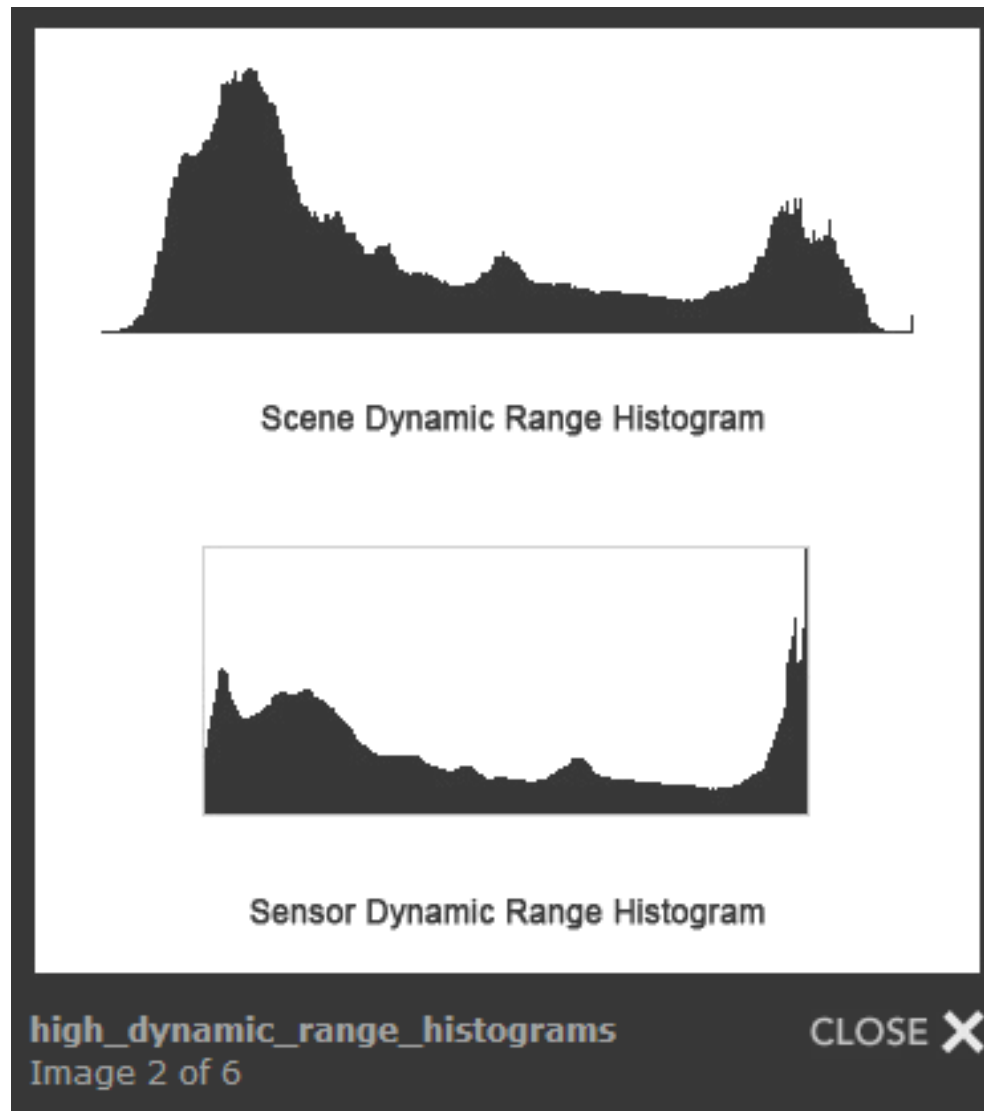
Man tæller simpelt hen antal fotoner fra henholdsvis billedinformationer og støj!

Heraf fremgår de helt afgørende kriterier for stort dynamisk område: **mindst mulig støj og mest muligt lys!**

- Støj er mindst mulig ved lavest mulig ISO indstilling
- Støj er mindst mulig ved største pixel (målt) i sensoren
- Lys mængde giver sig selv

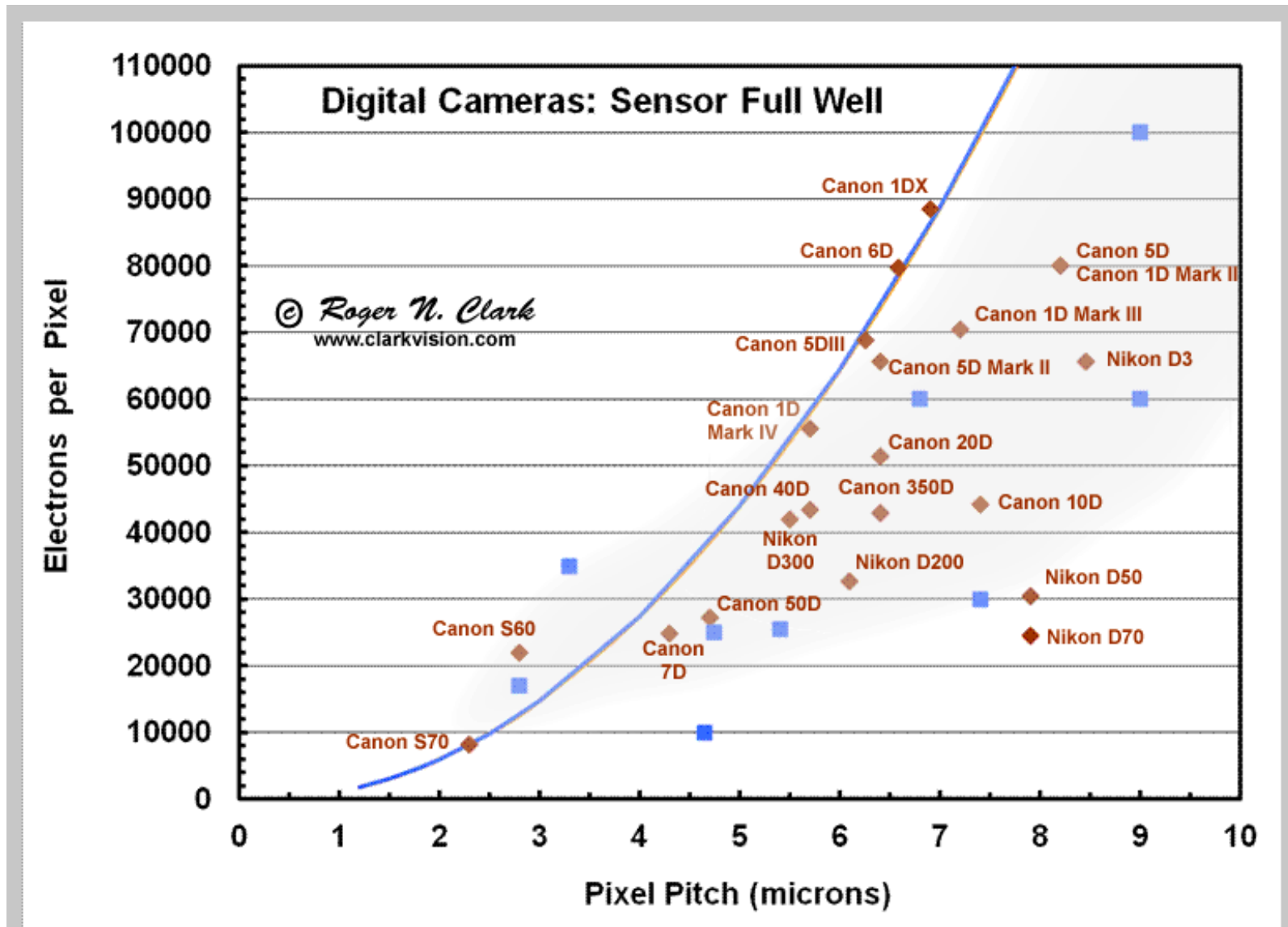
Dynamisk område (Dynamic Range)

Beskæring af billedinformation i sensor:



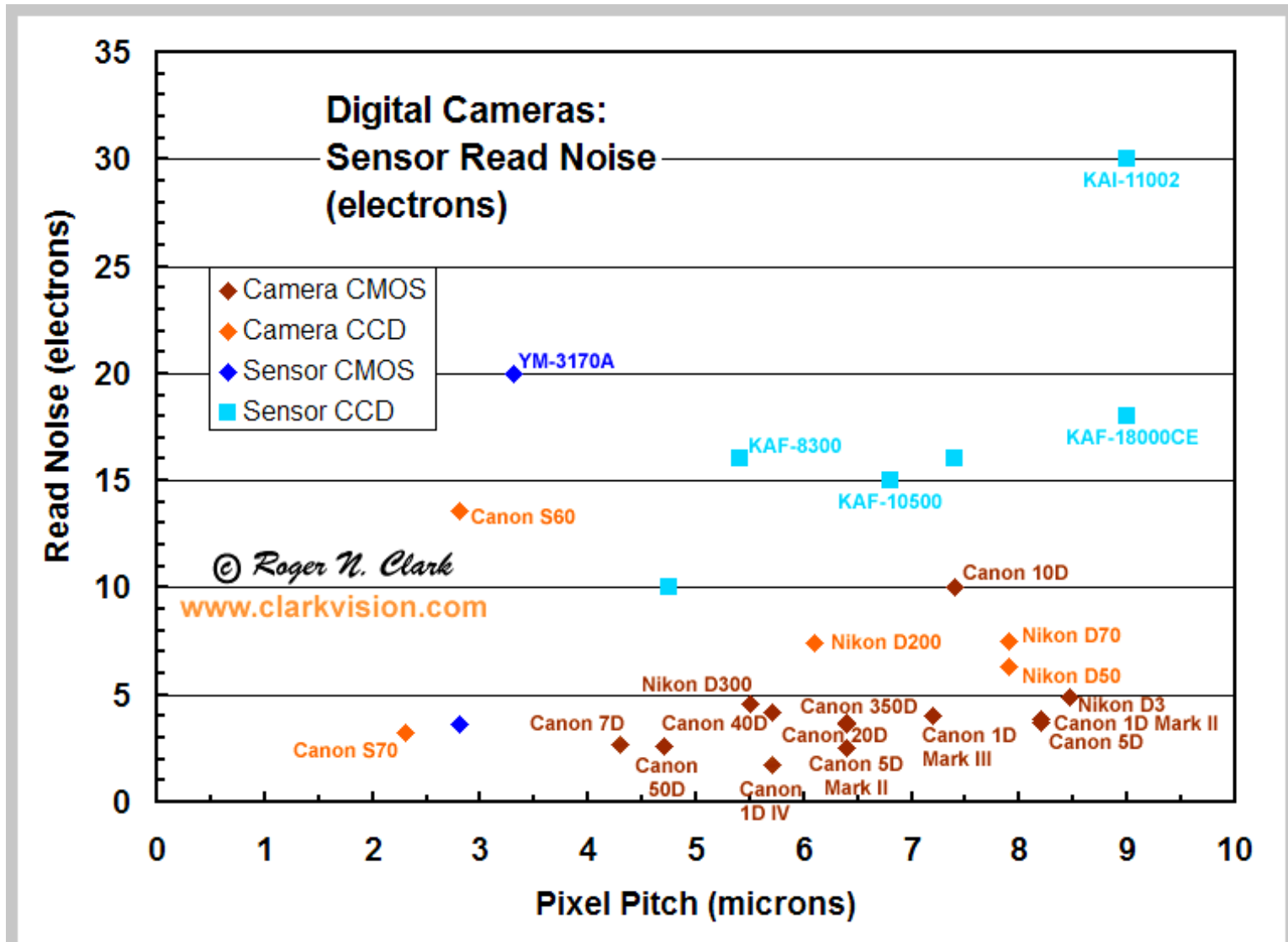
Dynamisk område (Dynamic Range)

Pixel størrelser i forskellige kameraer:



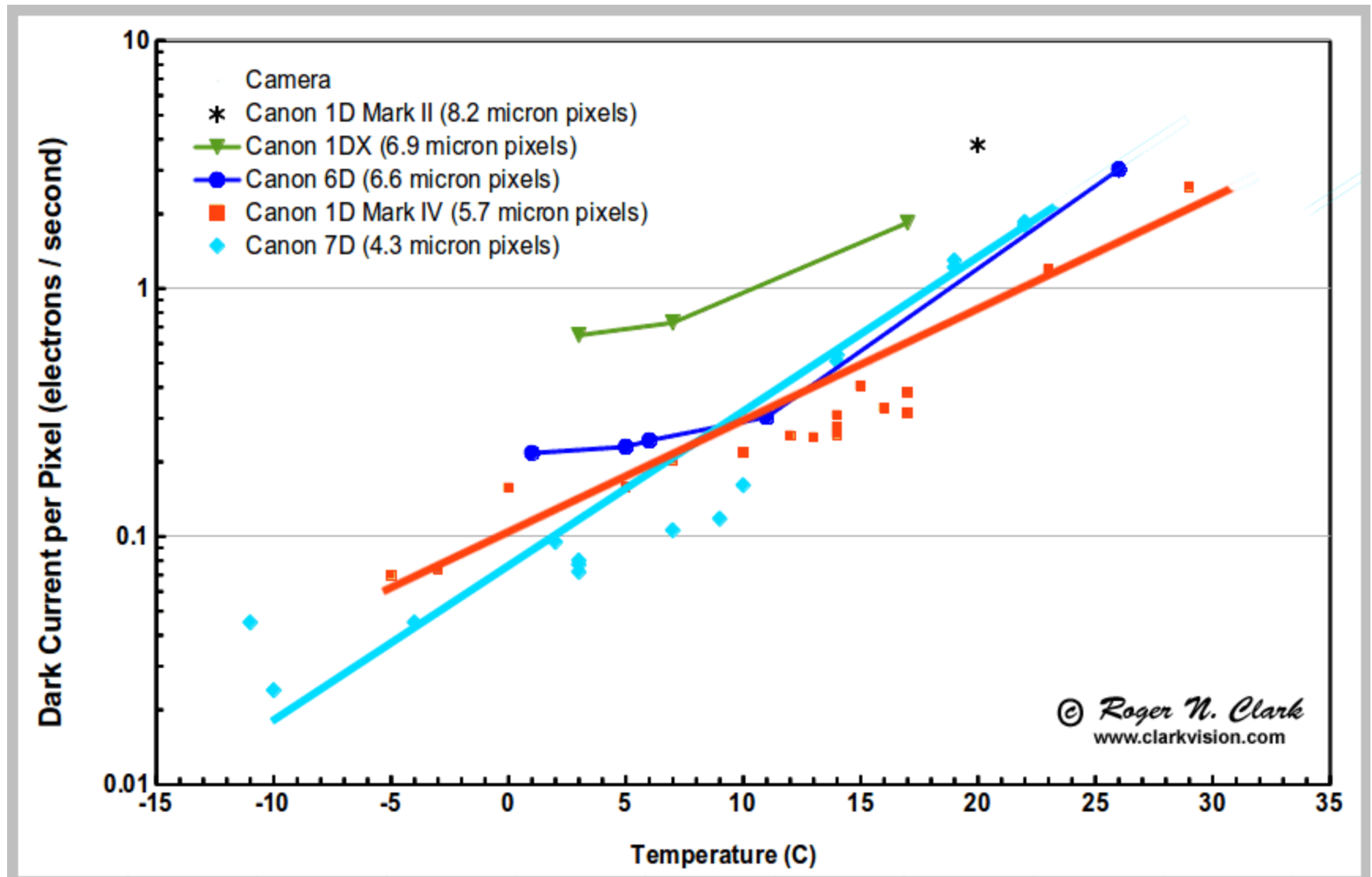
Dynamisk område (Dynamic Range)

Sensor støj i forskellige kameraer:



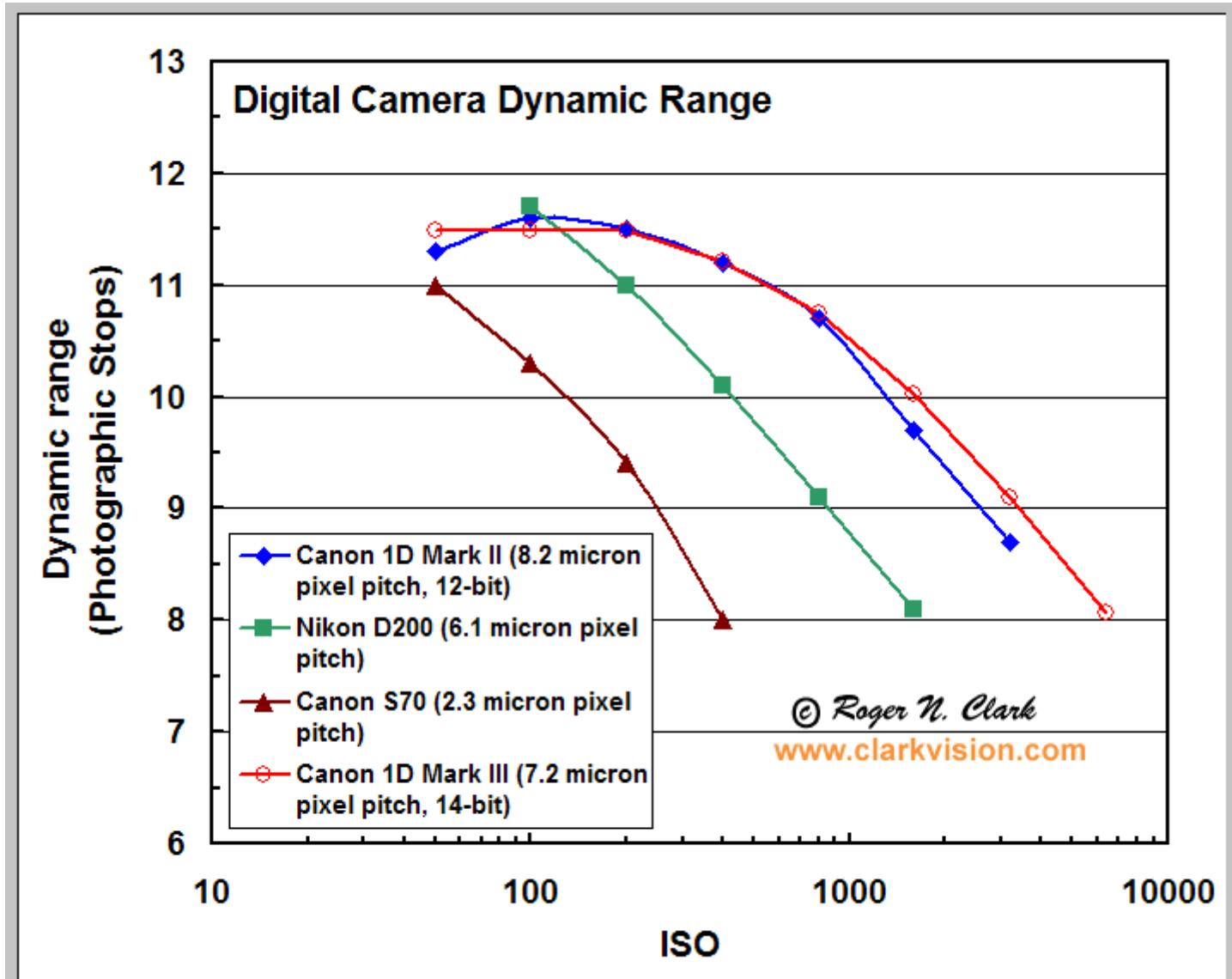
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Andre forhold af betydning i forskellige kameraer/sensorer:



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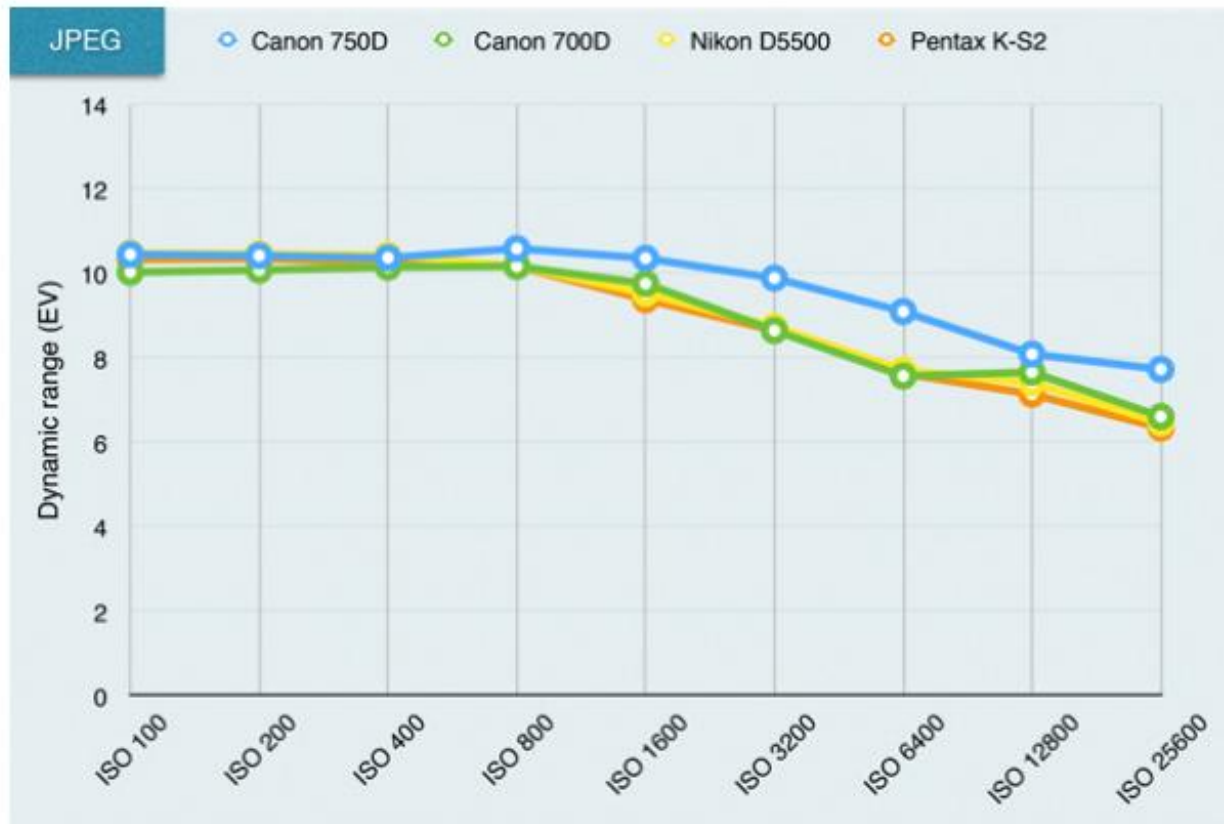
Dynamisk omfang for forskellige kameraer (målt i blænde-værdier):



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Dynamisk omfang for forskellige kameraer (målt i blænde-værdier):

Canon EOS 750D dynamic range charts



JPEG dynamic range analysis: The 750D has good, but not competition-beating dynamic range until sensitivity reaches around ISO 800. The 750D captures a wider range of tones than the other cameras at higher sensitivities.

Dynamisk område (Dynamic Range)

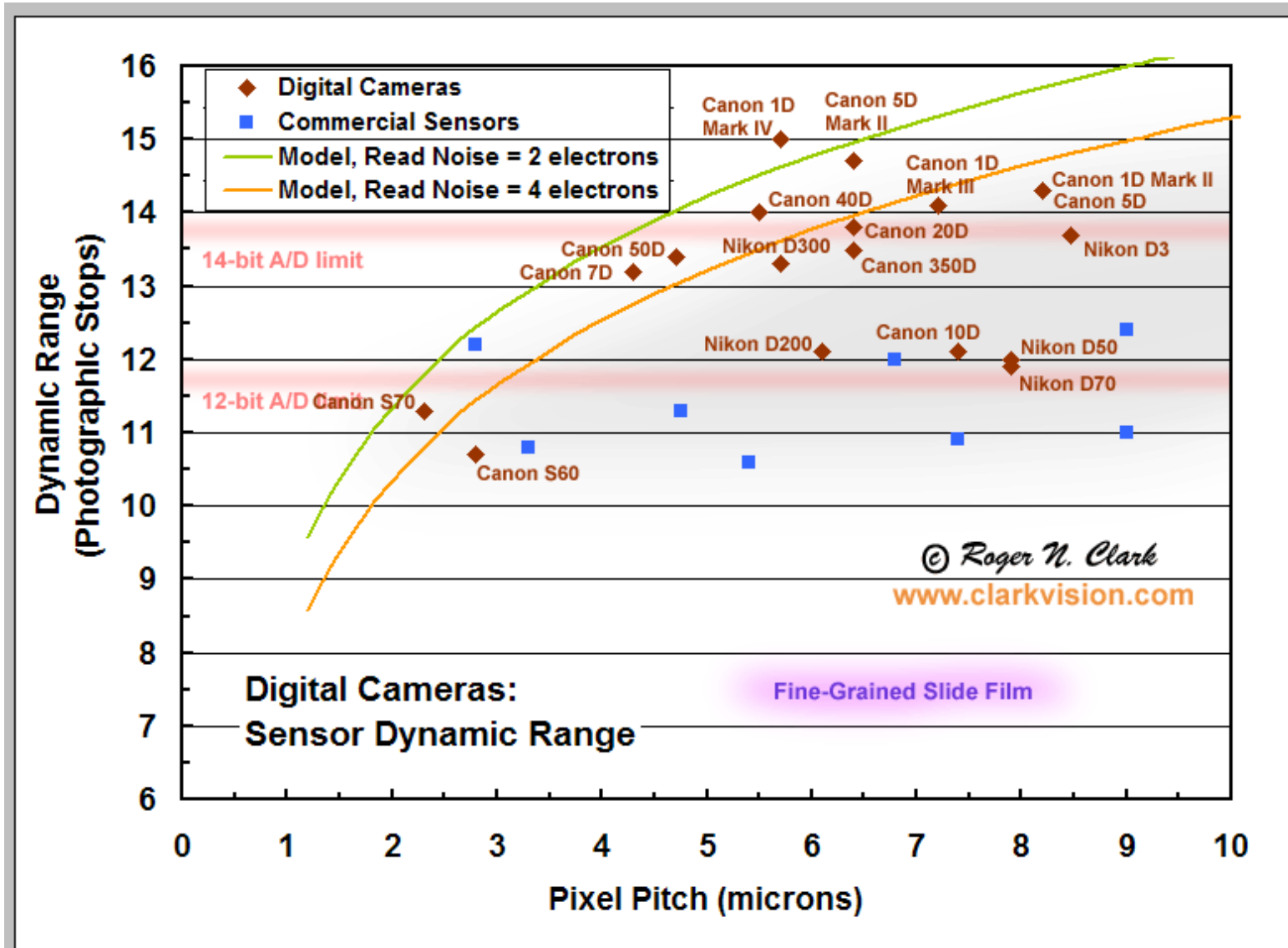
Dynamisk omfang for forskellige kameraer (målt i blænde-værdier):



Raw (converted to TIFF) analysis: The 750D and 760D capture a wide range of tones, especially at sensitivities below ISO 800. They are about 0.5EV better than the 700D at the highest sensitivity settings. However, they can't quite match the Pentax K-S2 which captures the widest spread of tones.

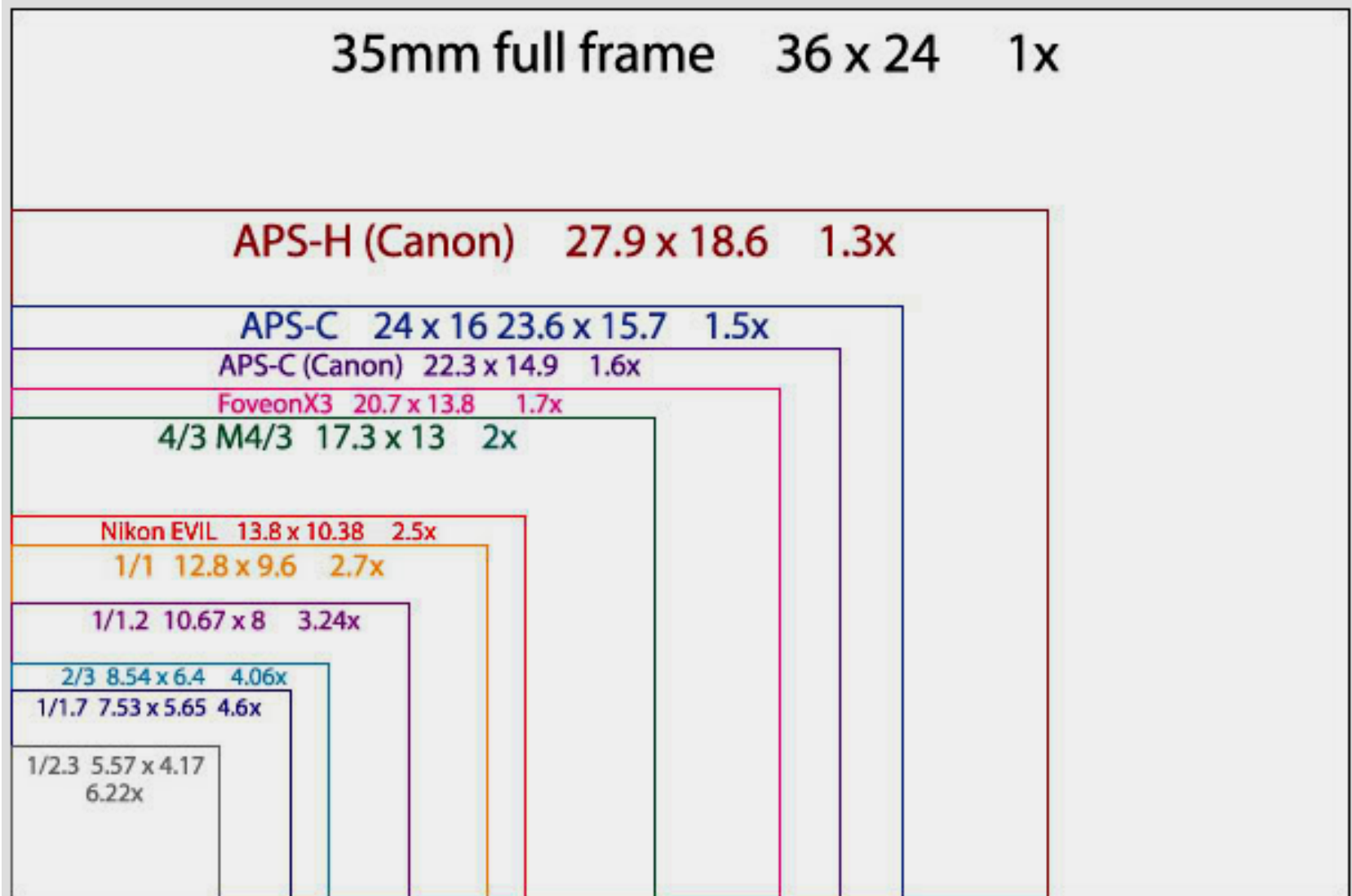
Dynamisk område (Dynamic Range)

Dynamisk omfang for forskellige kameraer (målt i blænde-værdier):



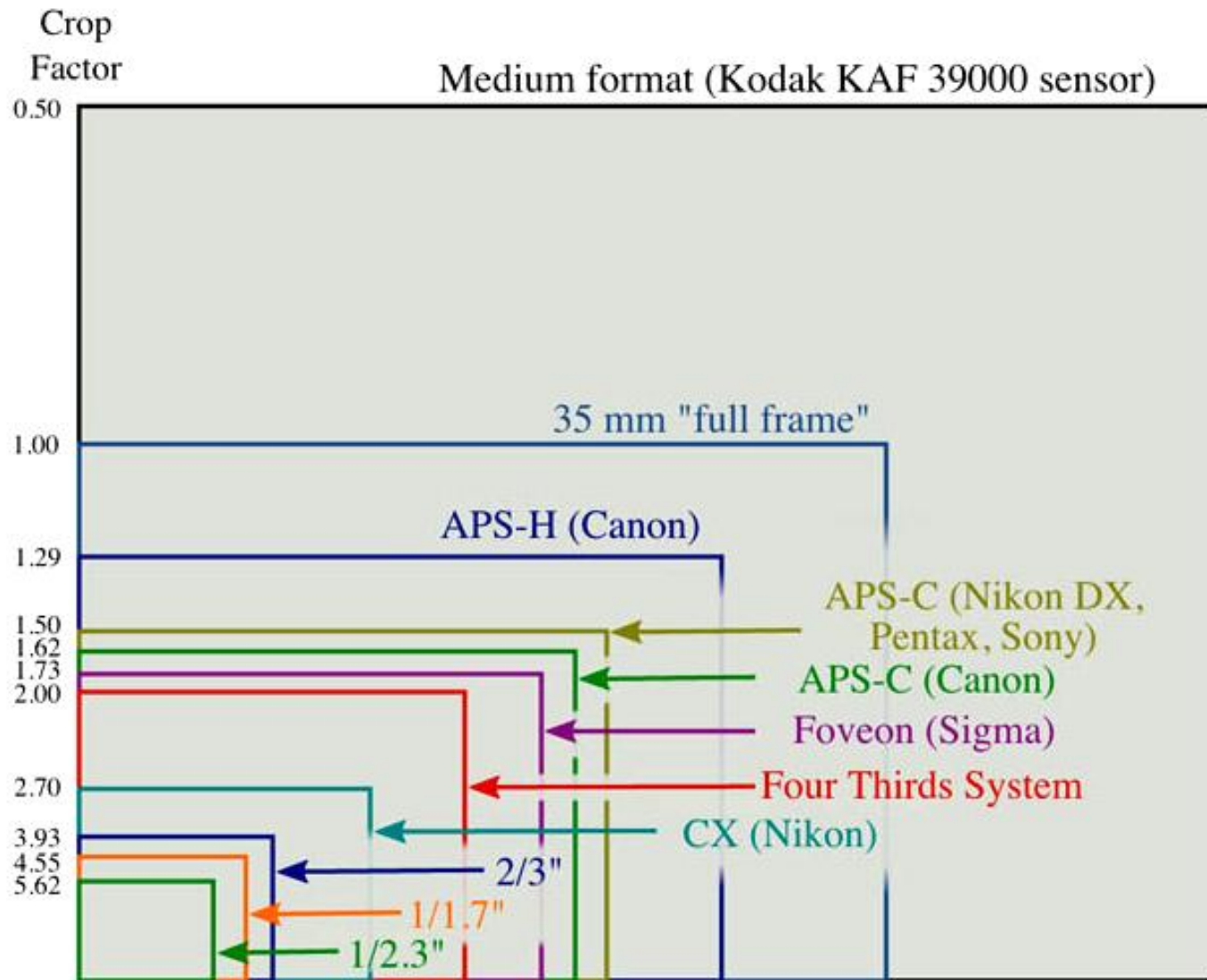
Dynamisk område (Dynamic Range)

Sensor størrelser for forskellige kameraer:




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Sensor størrelser for forskellige kameraer:



Dynamisk område (Dynamic Range)

Sensor størrelser for forskellige kameraer:


















Sensor type:	1/2.3"	1" (CX)	Four Thirds	APS-C	Full Frame
Surface area:	28.5 mm ²	116.2 mm ²	224.9 mm ²	330 - 370 mm ²	864 mm ²
Crop factor:	5.6	2.7	2	1.5 - 1.6	1
Used by:	Pentax: Q, Q10 Ricoh: GXR P10	Nikon: 1 J1, 1 V1, 1 J2, 1 V2	Olympus: E-P1, E-P2, E-P3, E-PL1, E-PL2, E-PL3, E-PL5, E-PM1, E-PM2, OM-D E-M5 Panasonic: G1, G10, G2, G3, G5, GH1, GH2, GH3, GF1, GF2, GF3, GF5, GX1	Sony NEX: 3, C3, F3, 5, 5N, 5R, 6, 7 Samsung: NX5, NX10, NX11, NX100, NX1000, NX20, NX200, NX210 Fujifilm: X-Pro1, X-E1 Canon EOS M Pentax K-01 Ricoh GXR	Leica: M9, M9-P, M-E, M Monochrom

www.DigiCamDB.com

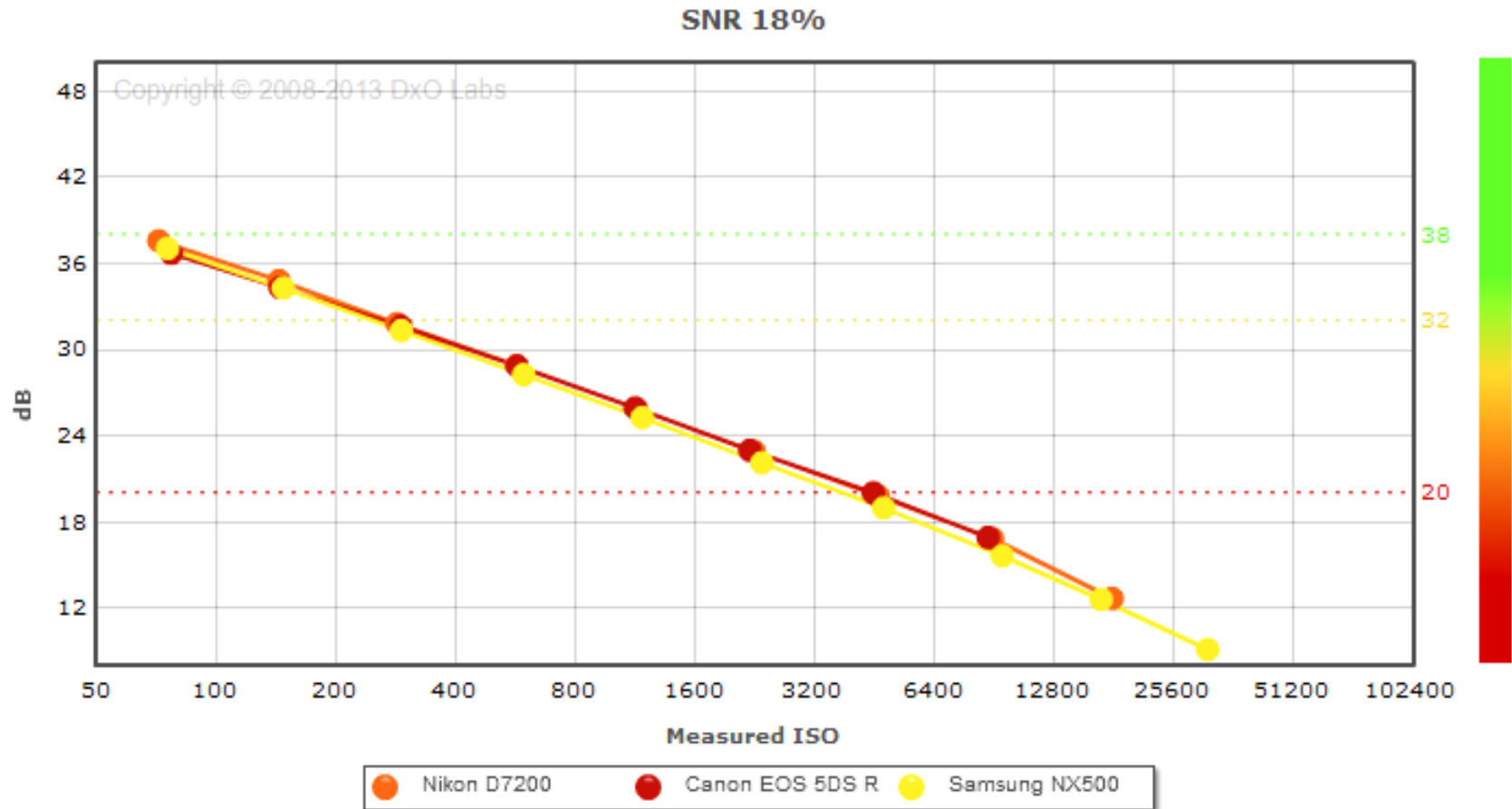
Dynamisk område (Dynamic Range)

Dynamisk omfang for forskellige kameraer: APS-C sensor (5DS dog FF!) Størrelse er omkring => 20 - 25 mm x 15 - 20 mm

Scores	Specs	Measurements	Lenses tested
Nikon D7200			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		87
Portrait (Color Depth)	[?]		24.5 bits
Landscape (Dynamic Range)	[?]		14.6 Evs
Sports (Low-Light ISO)	[?]		1333 ISO
DxOMARK			
Canon EOS 5DS R			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		86
Portrait (Color Depth)	[?]		24.6 bits
Landscape (Dynamic Range)	[?]		12.4 Evs
Sports (Low-Light ISO)	[?]		2308 ISO
DxOMARK			
Samsung NX500			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		87
Portrait (Color Depth)	[?]		24.8 bits
Landscape (Dynamic Range)	[?]		13.9 Evs
Sports (Low-Light ISO)	[?]		1379 ISO
DxOMARK			

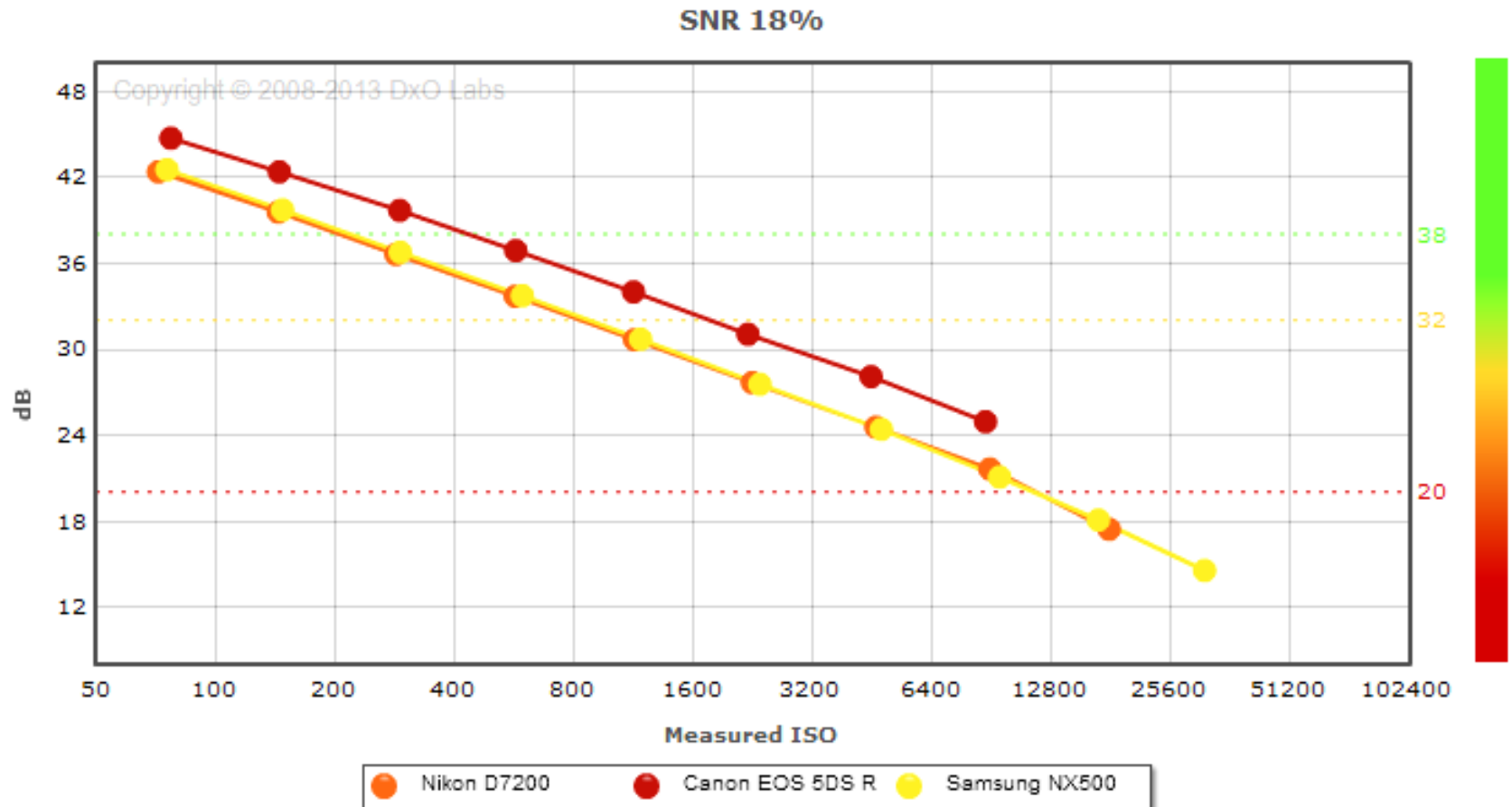
Dynamisk område (Dynamic Range)

Støj (vist på skærm) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)



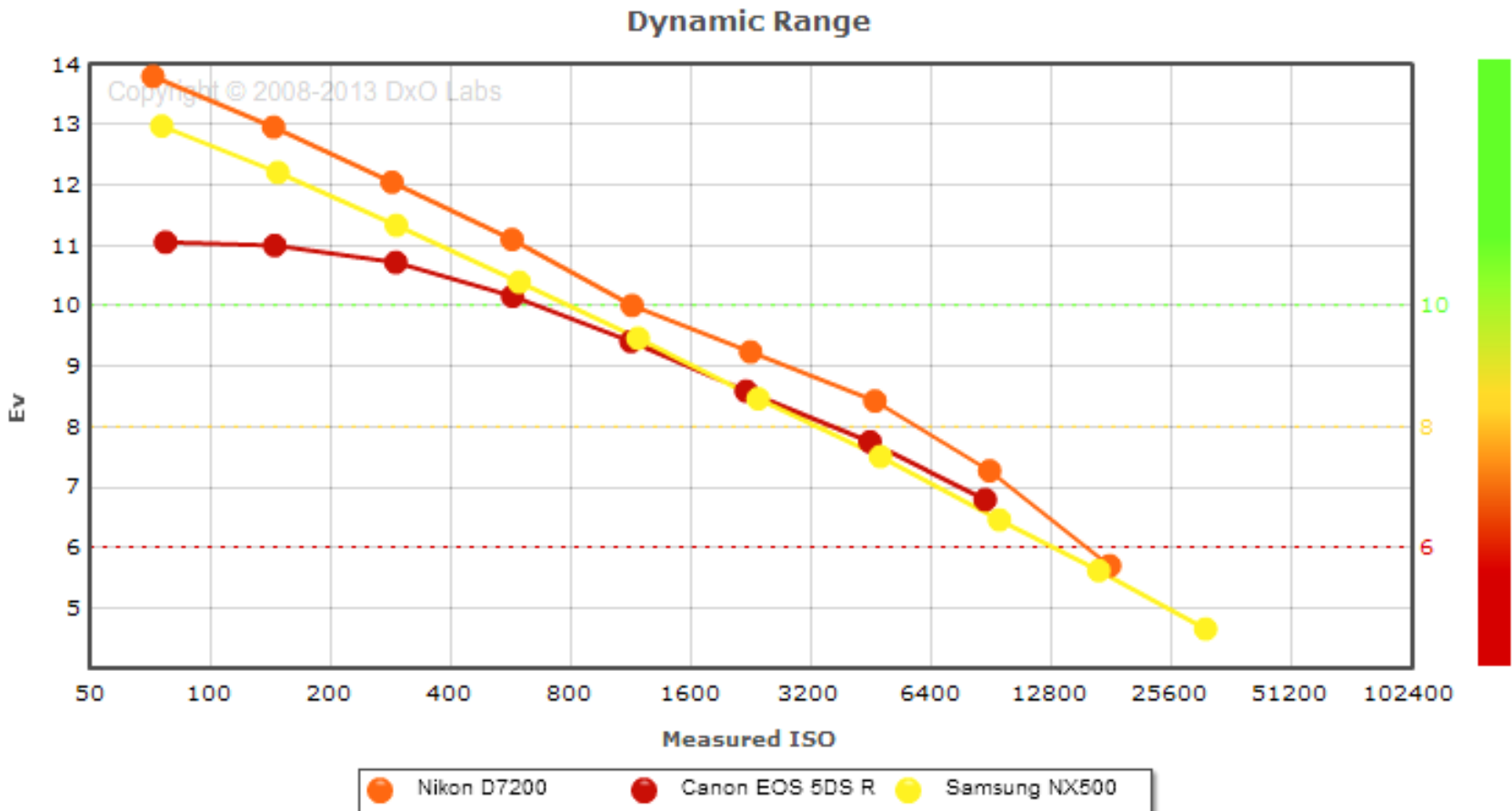
Dynamisk område (Dynamic Range)

Støj (vist på print) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)



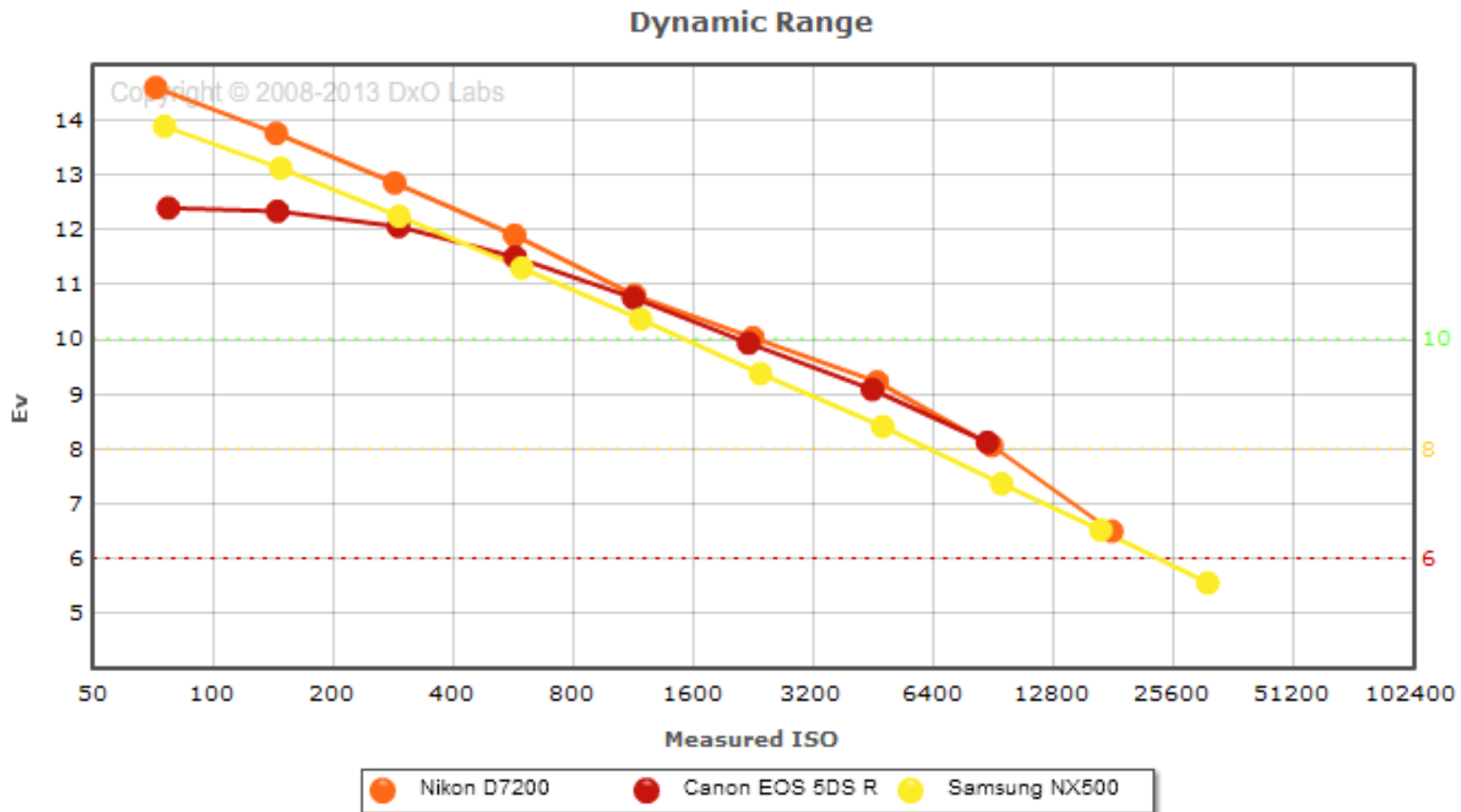
Dynamisk område (Dynamic Range)

DR (vist på skærm) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)



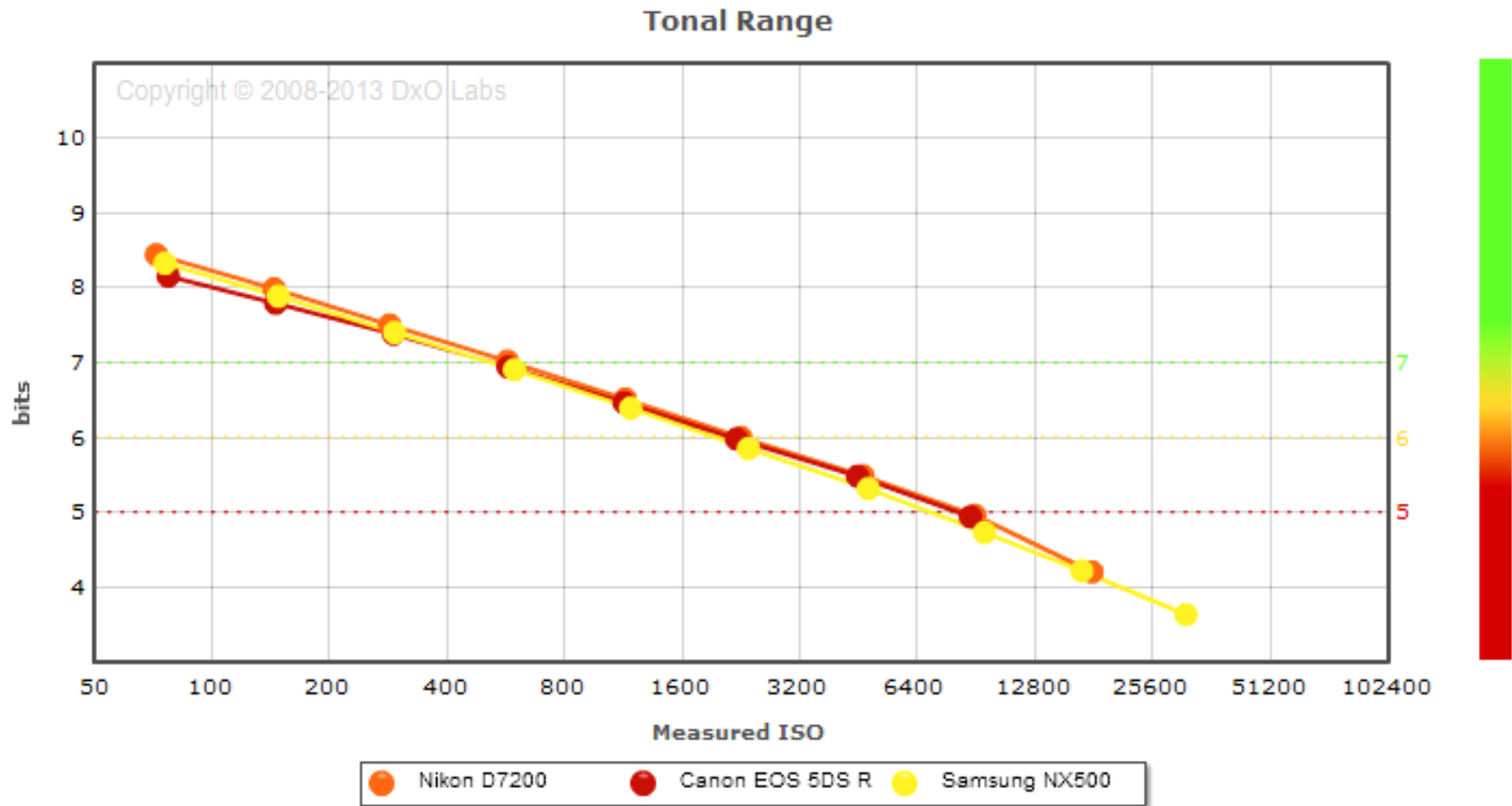
Dynamisk område (Dynamic Range)

DR (vist på print) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)



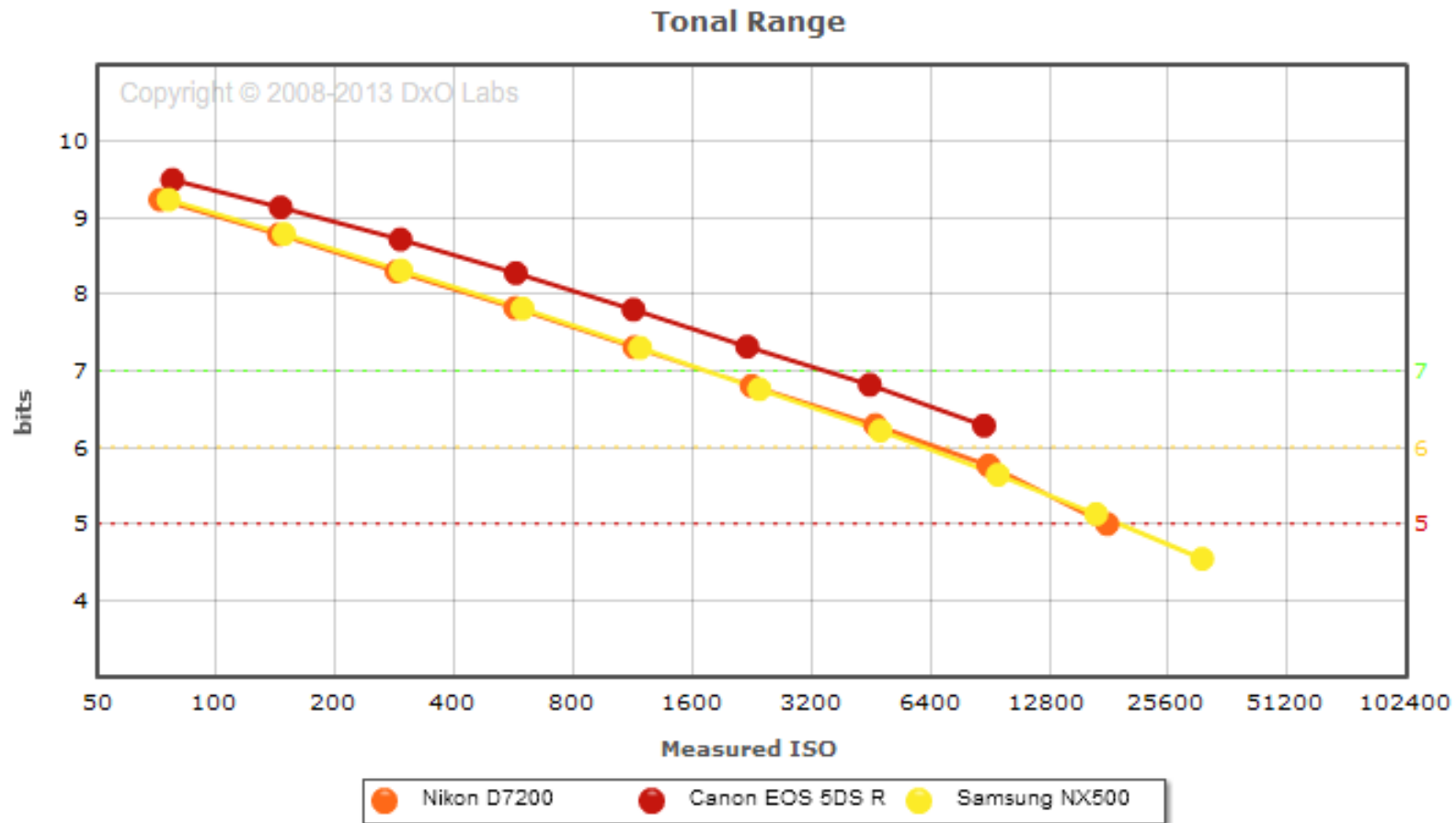
Dynamisk område (Dynamic Range)

Bit (vist på skærm) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)


















Dynamisk område (Dynamic Range)

Bit (vist på print) for forskellige kameraer som funktion af ISO:
APS-C sensor (5DS dog FF!)



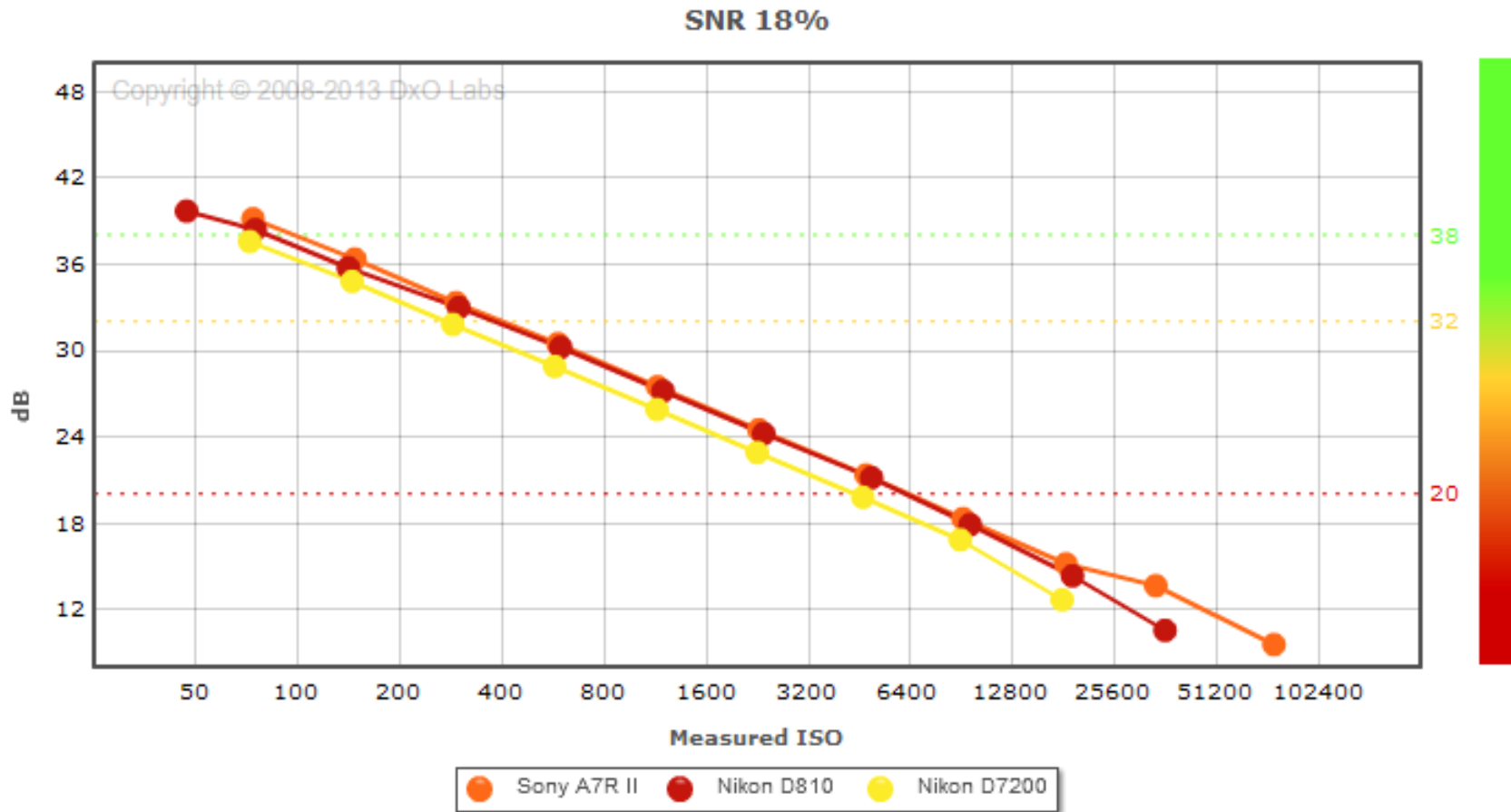
Dynamisk område (Dynamic Range)

Dynamisk omfang for forskellige kameraer: Full Frame sensor (D7200 dog APS-C!) Størrelse er => 24 mm x 36 mm

Scores	Specs	Measurements	Lenses tested
Sony A7R II			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		98
Portrait (Color Depth)	[?]		26 bits
Landscape (Dynamic Range)	[?]		13.9 Evs
Sports (Low-Light ISO)	[?]		3434 ISO
DxOMARK			
Nikon D810			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		97
Portrait (Color Depth)	[?]		25.7 bits
Landscape (Dynamic Range)	[?]		14.8 Evs
Sports (Low-Light ISO)	[?]		2853 ISO
DxOMARK			
Nikon D7200			
			
▶ DxOMark Sensor Scores			
Overall Score	[?]		87
Portrait (Color Depth)	[?]		24.5 bits
Landscape (Dynamic Range)	[?]		14.6 Evs
Sports (Low-Light ISO)	[?]		1333 ISO
DxOMARK			

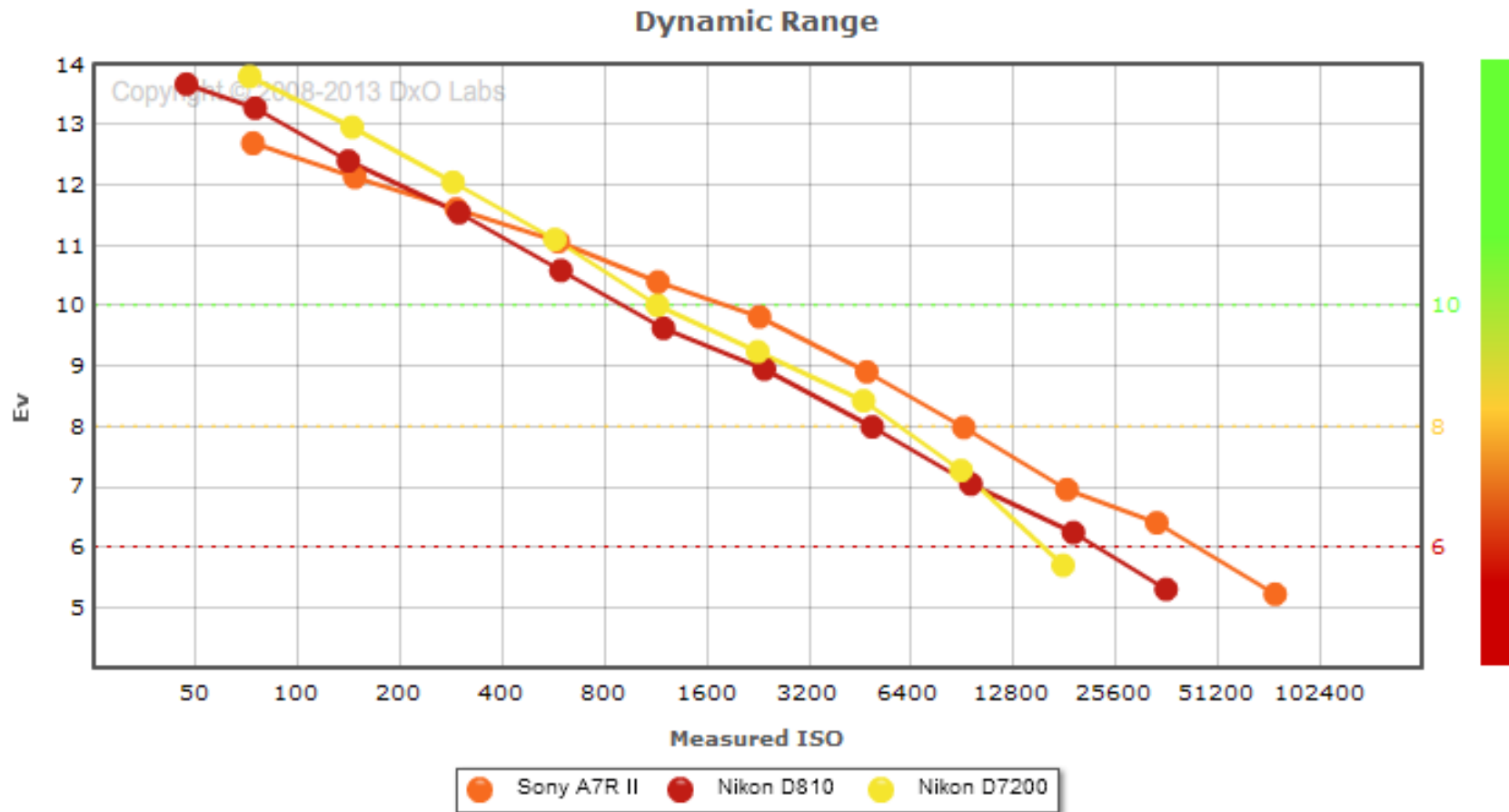
Dynamisk område (Dynamic Range)

Støj for forskellige kameraer som funktion af ISO: Full Frame (D7200 dog APS-C!)



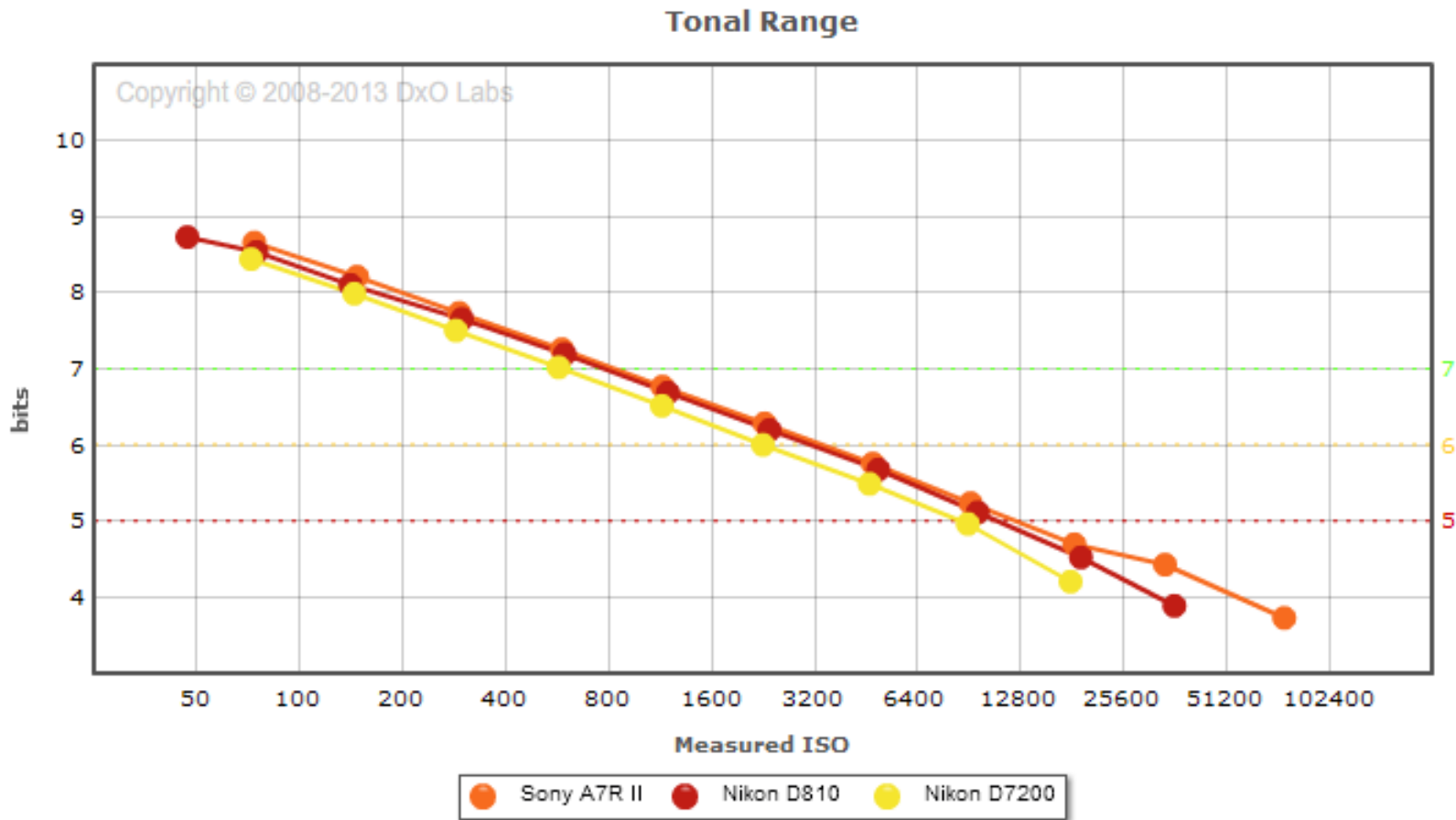
Dynamisk område (Dynamic Range)

DR for forskellige kameraer som funktion af ISO: Full Frame (D7200 dog APS-C!)



Dynamisk område (Dynamic Range)

Bit for forskellige kameraer som funktion af ISO: Full Frame
(D7200 dog APS-C!)



Dynamisk område (Dynamic Range)

Det var teori, **her er praksis**: Hvad giver det bedste billede => største pixel og laveste støj? Se nedenfor!!!!!!!!!!

Form faktor betyder altså så meget, at det 'overdøver' de øvrige ulemper i form af sensor/pixel størrelse og lav støj!

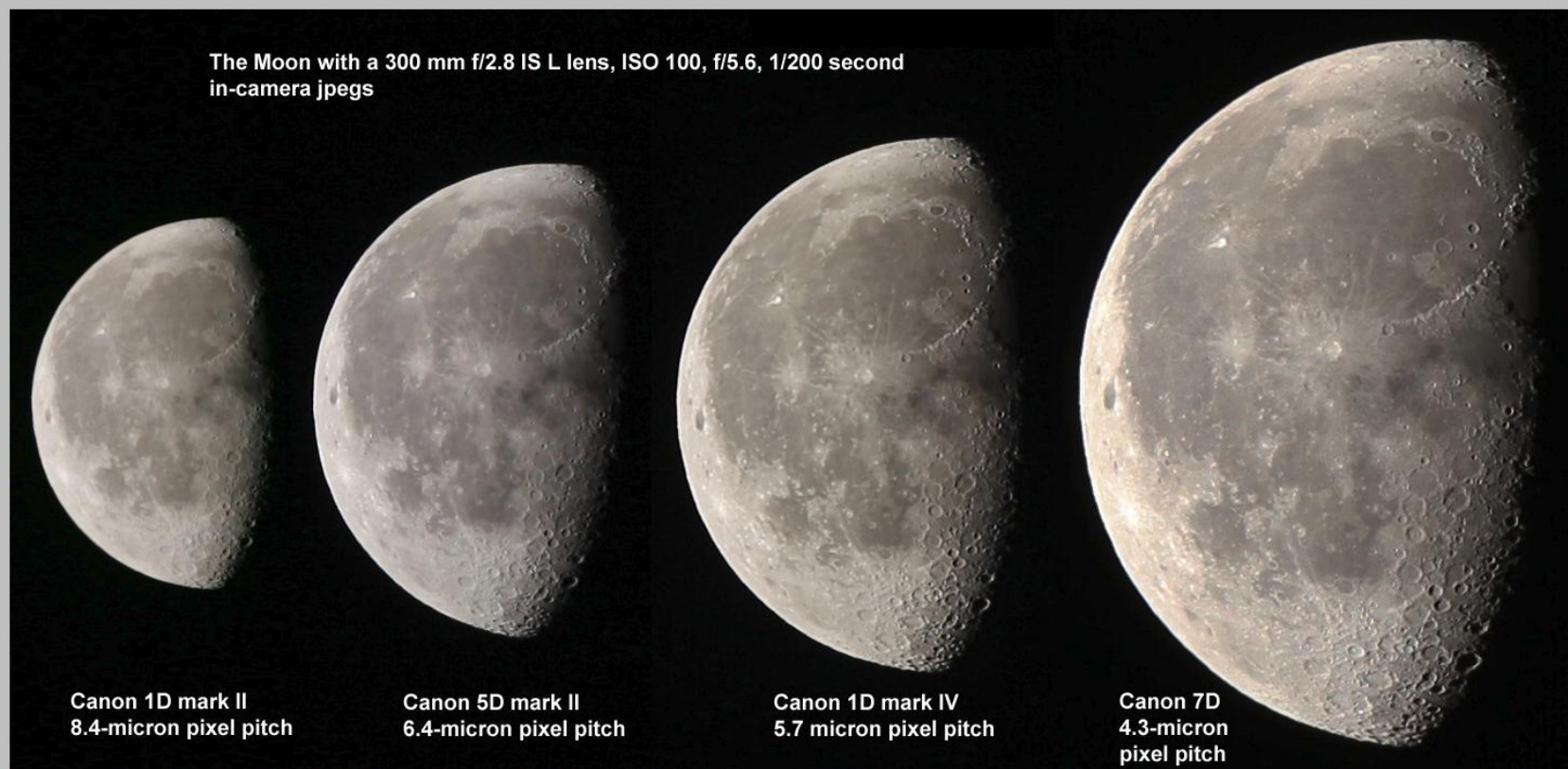


Figure 15. The Moon photographed with 4 different cameras using the same lens, so focal length is the same for each image. This is the full resolution image produced in the camera and written as a jpeg file. No post processing sharpening has been done. The 1D Mark II camera has 8.2 micron pixels, collecting more light per pixel giving very high signal-to-noise ratios. The 5D Mark II camera has 6.4 micron pixels which resolves finer details, but with lower signal to noise ratios. The 1D Mark IV has smaller pixels but delivers a better image despite a lower signal-to-noise ratio per pixel. The 7D, with the smallest pixels and lowest signal-to-noise ratio delivers the best image despite having the lowest signal-to-noise ratios per pixel of the 4 cameras.