Re: Basic newbie question on cmos sensor and optics

Source: http://sci.tech−archive.net/Archive/sci.optics/2005−05/msg00058.html

- *From*: "surfer" <opto1310@xxxxxxxxxxx>

- *Date*: 6 May 2005 04:21:08 −0700

??The bigger, more costly sensor, with more pixels of a similar size,
needs MORE LIGHT to illuminate those pixels
== correct, the lens is to be scaled up proportional to the sensor
size. Scaled will be teh focal length AND diameter, so more light will
be collected

??so your optics must be
designed with a larger field of view, in order to provide that light.
== wrong, FOV has nothing to do with it.

??If you take the same optics, and just increase the magnification, so
that the real field of view is the same, but your resolution just went
up −− your effective sensitivity will go down in proportion as the
sensor area goes up, just as you are worried about
== when switching to the larger sensor with the same optics to image
the same size object, resolution increases, but magnification DECREASES

So, if you really
need that sensitivity, either use the higher resolution sensor to
image a larger (real) field of view, or use a bigger lens to collect
more light at the higher magnification,
==if you need more sensotivity (exposure) − get it. Is is all about
numerical aperture, or F−number of the lens. "Effectie f−number" at
finite cojugates, to account for lens to sensor distance ratehr than
EFL.

Have you ever noticed how those little cheap point−and−shoot digital
cameras with lots and lots of megapixels, take really crappy pictures
in dim light situations? It's because what they really need is a
bigger diameter lens to collect enough light to fill all of those
pixels.
==if by crappy you mean noisy, I agree. Resolution wise, the main
reason is they do not have good lenses, so at low light the aperture is
wide open and aberratons kill the image quality. When there is a lot
of light, the aperture is small, and aberratons are negligible. At
about F/64, you can do with no lens at all − people did so in the early
days of photography

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- ***Follow−Ups***:
  - ♦ ***Re: Basic newbie question on cmos sensor and optics***
    - ◊ *From:* Eric R Snow

- ***References***:
  - ♦ ***Basic newbie question on cmos sensor and optics***
    - ◊ *From:* Antonio Pasini
  - ♦ ***Re: Basic newbie question on cmos sensor and optics***
    - ◊ *From:* KLFrosty

- Prev by Date: ***Re: What kind of lens combinations best for loupe'?***
- Next by Date: ***Glare from 'anti−glare' coating!***
- Previous by thread: ***Re: Basic newbie question on cmos sensor and optics***
- Next by thread: ***Re: Basic newbie question on cmos sensor and optics***
- Index(es):
  - ♦ ***Date***
  - ♦ ***Thread***