

Samsung NX10



**Samsung NX10 hybrid digital camera
1080p quality at 30fps including stereo sound.**

**The focus system is based on
16-point AF contrast detection as well as tracking AF.**

**The CMOS sensor features a sensitivity range from 100-3200,
including ISO 50 and ISO 6400 as an extra boost.**

**3-inch AMOLED screen
with a resolution of 921,000 dots and a refresh frequency of 120Hz.
Hi-Speed USB 2.0 and HDMI
Bluetooth and Wi-Fi.**

**Samsung camera specifications
The sensor used on the Samsung NX10 camera is
a 23.4x15.6mm APS-C 14.6 Megapixels CMOS sensor.**

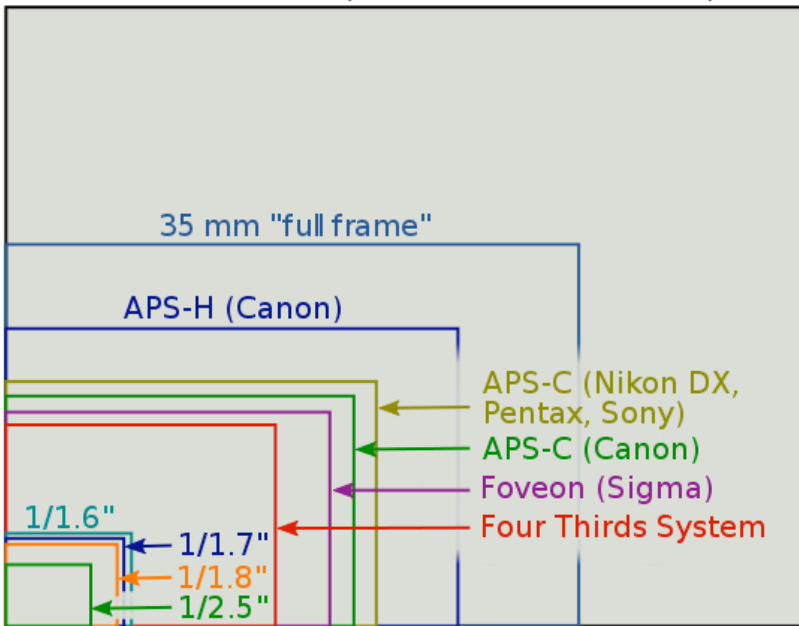
**Thanks to this, the NX10 completely outstrips competing system cameras such as the
Panasonic Lumix GF1 and Olympus PEN E-P1.**

**Features a built-in optical image stabilizer
and uses a so-called DRIM image processor.**

**Although we suspect it to be a DRIM II version,
since the current DRIM processor has already been used
in Samsung's NV- and WB-series cameras for quite a while now.**

**APS-C
<http://en.wikipedia.org/wiki/APS-C>**

Medium format (Kodak KAF 3900 sensor)



The Future of Digital - Full Frame or APS-C?

<http://www.bobatkins.com/>
<http://www.bobatkins.com/photography/>

The Future of Digital - Full Frame or APS-C?
There's lots of discussion these days on whether

digital will move to "full frame,"
meaning sensors which are 24x36mm, or

whether a smaller frame size will "be good enough."

The smaller frame format is usually called APS-C
and is the typical "1.6x multiplier" format
used by many manufacturers
(Canon, Pentax, Minolta and Nikon
- though Nikon have a 1.5x "multiplier").

The use of the term "APS-C"
is perhaps unfortunate
for a format some are hoping
will stay around.

It's derived from the similar frame size of the late, but not lamented, APS film format (APS
"Classic" format was 23.4 x 16.7 mm).

We all know what a success that was.

Smaller, lighter cameras were promised - but not delivered,
and image quality,
though fine for small prints,
couldn't match 35mm.

Image quality may have been
"good enough"

for the vast majority of users
(who rarely make a print larger than 5x7),
but that didn't really help!

So what about

APS-C (ca. 22mm x 15mm)
as a digital format.

Will it survive?

My guess is that it will be with us for a while, but in the end it will fade out.

Why?

Because nobody ever got rich
by telling the American public
that what they had was good enough
and that they really didn't need anything better!

If 24x36mm sensors
had been available for the same price as 22x15mm sensors
do you think anyone
would have made a camera
with the smaller sensor?

Would arguments
about it being "good enough"
have convinced the consumer?
Of course not (look at APS again).

The sole reason
we have APS-C sized sensors
is cost and availability.

To make a camera
that retails at under \$1500 today, you have to use a small sensor.

That sensor yields excellent quality, quality good enough
to lure vast numbers
of photographers away
from using film.

Did the camera manufacturers
pick that size
because they thought
it was better than full frame 35mm?

No.

Do most photographers actually want a small sensor?

Again the answer is no.

They'd rather have
a full frame sensor,
but they just can't afford it.
You could argue that 35mm
was good enough
and people didn't move
to medium or large format,
but that's a cost
and convenience issue.

Both medium and large format cameras
are much larger
(and more difficult
to use for the amateur)
than 35mm cameras

and both medium and large format processing is difficult to find and expensive.

On the other hand APS-C
and full frame DSLRs
are about the same size
and the cost and ease
of processing the images
is essentially the same.

So where does the future lie?

Yields on larger sensors
are improving and
the result is better availability
and lower prices.

It may take another 5 years
before they get to the price point
that smaller sensors are today,
but eventually they will get there.

The major camera makers
will then offer them
as an "upgrade" path for users
of smaller sensor cameras.

As I said before,
nobody ever got rich
by telling people that what they had was good enough and
that they didn't need anything better.
If you don't believe that,
just look at sales ever larger SUVs, or ever faster sports cars,
or ever larger
and more expensive LCD TVs.

Do we need them, no.
Do we want them?
Of course we do!
There are now
a number of manufacturers
making lenses
that only cover a 22x15mm frame,
so there will be
a lot of lenses out there
that can only be fully used
on APS-C sensor bodies,

and that will probably keep the production
of smaller sensor cameras going
for quite a while,
but my guess is that
they will end up being aimed
at the lower end of the market
and once full frame sensor cameras drop below \$2000,

that's where the manufacturers attention is going to be.

Marketing and advertising
will switch from telling photographers
about the benefits
of the small sensor cameras,
and start telling photographers about the benefits
of full frame sensor cameras.

There may well be a consumer market for DSLR
with 8-10MP APS-C sensors
selling for under \$750 or so
for a long time,
but the more serious photographers will certainly move
to full frame bodies
(with maybe a 12MP sensor)
if and when the price
falls below \$2000.

Another thing that will drive a whole industry move to larger sensors is, of course, when one of
the major manufacturers
(and my money is on it being Canon)
brings out
a 24mm x 36mm sensor camera
at an affordable price.

The others will have to follow
(if they can) or lose sales.

If you want another driving force
for larger sensors,
it's megapixels.

There's a limit
to the number of pixels
you can cram onto
an APS-C sized sensor
before you start to run into
real problems with noise
due to small pixel size.

You can't make a noiseless sensor and the smaller the pixels,
the higher the intrinsic noise.
There's a lower limit to noise
which is determined
by fundamental physics
and includes things like
photon shot noise
which is determined by
the statistics of photons
hitting a pixel,
plus various forms of
thermally induced noise.

At some point you'll hit a limit
to the number of usable pixels
on an APS-C sized chip.

It's probably in the 10-12MP range.
People like more pixels
and will usually pick
a 12MP camera over
a 10MP camera over
an 8MP camera.

At some point the only way
you can up the pixel count
without lowering image quality
(by increasing image noise)
is to go to a bigger sensor.

That's why 8MP DSLRs
outperform 8MP consumer digicams
with 5mm x 7mm sensors.

Size matters.
Won't the number of APS-C coverage lenses out there
keep the APS-C format in production?

Well, there are
millions of Pentax Screw mount lenses out there

and nobody makes a camera body that uses them.

There are probably millions of Canon FD mount lenses, including very expensive telephotos, out there and Canon no longer make a body that can take them.

There are other examples of lens systems that have died out. I see no real reason why the existence of APS-C format lenses should mean the format will control the market or prevent the introduction of full frame sensors in consumer DSLRs. Most owners of APS-C format DSLRs will also have full frame lenses - probably more full frame lenses than APS-C coverage lenses - so upgrading to a full frame sensor isn't an insurmountable problem. An exception may be the Olympus 4/3 system (E1, E300).

It has an even smaller sensor than APS-C (18mm x 13.5mm vs 22mm x 15mm), however it's an integrated system with all lenses specifically designed for 18x13.5mm coverage.

You can't use a bigger sensor, therefore there's no obvious "upgrade" path. I imagine it will stay with that format as long as it's in production.

Should we avoid buying APS-C DSLRs and lenses because one day they may be "obsolete"?

Definition:
Obsolete - no longer in use:
outmoded in design, style, or construction

Certainly not.

I have an APS-C sensor DSLR myself and I have one APS-C lens.

I might well buy another one. One day I might not be able to fully use them on my full frame DSLR, but I buy lenses to use today, not in 5 years time.

I wouldn't buy a \$7000 super telephoto lens with APS-C coverage, but then again I don't expect Canon or Nikon will ever sell one!

We buy all sorts of things that become "obsolete."

**How much did you pay for your first computer, and where is it now?
How about that 10MB hard drive you paid \$500 for in 1990,
or that 64Kbyte (yes, kilobyte) S100 memory card that cost you \$200 in 1978?**

**How much did you pay for your car,
what's it worth today and what will it be worth in another 5 years?**

**Some people seem to look on lenses
as investment vehicles that should hold their value and utility forever.**

**I'm not quite sure why they apply this logic to lenses,
but not to cars, TVs, VCRs etc.**

**Cameras and lenses are tools.
If you use them, you'll get value from them.
If you leave them sitting on a shelf, you won't.**

**If you want to invest, buy gold or real estate!
Of course it would be nice if every lens
and every body worked with every other lens
and every other body from now until the end of time.**

**It would be nice if all Canon lenses
worked on all Nikon cameras and vice-versa.**

However neither is likely to happen.

**Just as an aside,
it's possible to build an APS-C to full frame 35mm converter
which would act as a 1.6x multiplier and which would cover the full 24mm x 36mm frame.**

So your 10mm f4 APS-C lens (which has the same field of view as a 16mm lens on a full frame camera) would become, with the 1.6x converter, a 16mm f6.4 lens when mounted on a full frame DSLR! And so you get back to where you started! It defeats the point of APS-C lenses of course, but I'm just pointing out that you could, in fact, use reduced format (APS-C) lenses on 35mm format DSLRs with an appropriate optical interface. You could also go the other way too.

You could make a "full frame" to "APS-C" focal length reducer. While such reducers are very uncommon photographically, they are made for use with telescopes for astrophotography (where they are usually known as "compressors" or "telecompressors". They reduce the focal length, reduce the frame coverage and increase the effective speed of a lens!

So you could, in theory, take a full frame 24mm f2.8 lens, add a 1.6x reducer and end up with a 15mm f1.8 lens with APS-C frame coverage! Of course the downside to optical converters is that they can reduce image quality unless well designed, and it's somewhat tricky to make them work well with extreme wideangle lenses, but such converters are possible.

An APS-C to Full Frame converter would be one way in which a manufacturer could ease users into full frame cameras. I don't see it as likely, but I do see it as possible.

The Bottom Line

I don't think you can make predictions based mainly on photographic "needs."

You have to take into account photographic "wants" and the influence that marketing and advertising have to make the consumer want what technology can deliver. Given the existing base of full frame 35mm cameras and lenses with full frame 35mm coverage, my money is on full frame 35mm DSLRs eventually becoming dominant in the market.

I'd say that \$2000 is the magic number right now, and today nobody is near that, though the Kodak DCS/Pro 14MP full frame DSLR has recently been selling (new) for \$3500. Now it has its problems and it's certainly not a Canon EOS 1Ds mark II, but it is a DSLR with a 14MP 24mm x 36mm sensor.

I think it's clear that in a few years, a full frame camera under \$2000 is certainly possible, even likely. Things move much faster than many people expect. Remember that only 9 years ago you'd have had to pay \$20,000 for a 1.3MP DSLR with a 16mm x 20mm sensor (EOS DCS 3). Even just 4 years ago a 3MP DSLR (APS-C) was selling for \$3000 (EOS D30). Today you can buy a 6.3MP APS-C camera for \$800 (actually \$500 with the current Canon Rebates!)

What will the DSLR lineup look like in 5 years time?

I'm guessing a pro level DSLR, 36x24mm sensor and 24MP,
a mid level DSLR 36x24mm sensor with 16MP,
a prosumer level DSLR 36x24mm with
a 12MP sensor and a consumer level DSLR,
which maybe will still have a 22x15mm (APS-C) sensor but with 8MP.

Each level will not only have more pixels,
but more features, faster frame rates, buffer sizes etc.

Prices around

\$4000-\$5000,

\$2500-\$3000,

\$1200-\$1500 and

\$500-\$750 respectively (in terms of 2004 dollars).

Could I be wrong? Yes, of course. It's very unlikely that I have everything right. It's not even sure I have anything right! Predicting the future is never easy. In 5 years time I guess we'll find out.