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Pixel Size's Effect Upon Photo-Resolution

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Pixel Size's Effect On Photo-Resolution

Research by Levi DeWitt, project overseen by Rion Huffman
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Research question:

**Pixel count vs. pixel size;
Which of these is more
important in determining
the resolution of an image?**

**A standardized resolution
chart was photographed by
4 Cameras with 4 different
sized image sensors**

**Each camera was given
a resolution score based
on the most narrow point
where all 9 lines from the
chart are distinguishable**



Hasselblad® H3D
Pixel Count - 39 megapixels
Pixel Size - 65.5197 μm^2



Canon® EOS-1D X
Pixel Count - 18 megapixels
Pixel Size - 51.4403 μm^2



Canon® EOS Rebel SL1
Pixel Count - 18 megapixels
Pixel Size - 19.7825 μm^2



Canon® PowerShot ELPH 180
Pixel Count - 20 megapixels
Pixel Size - 1.6923 μm^2

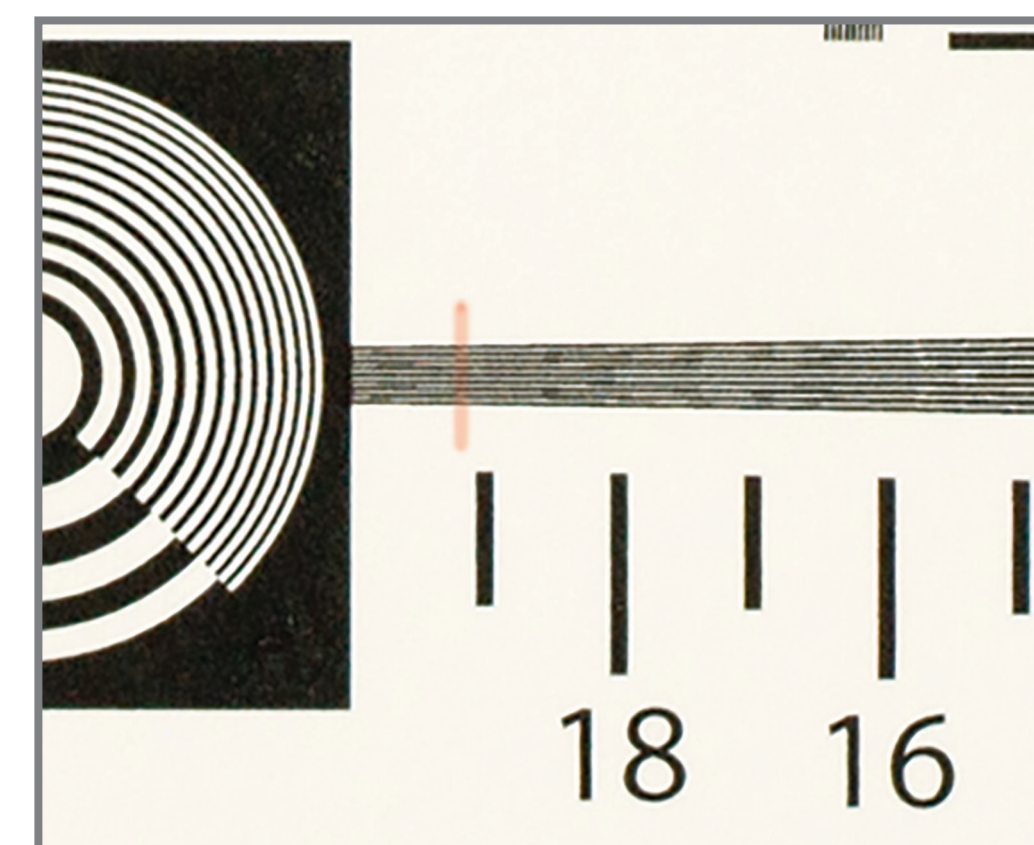


Figure 1.1 - Hasselblad RTC Score

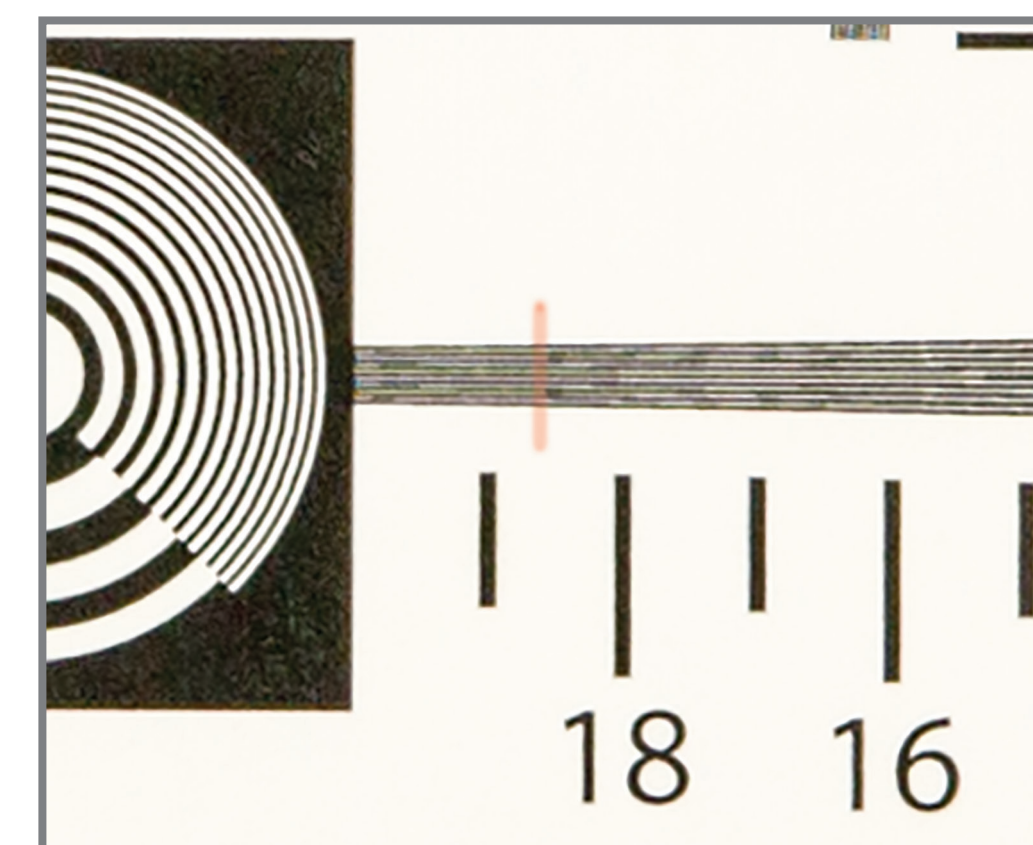


Figure 1.2 - 1D X RTC Score



Figure 1.3 - Rebel SL1 RTC Score

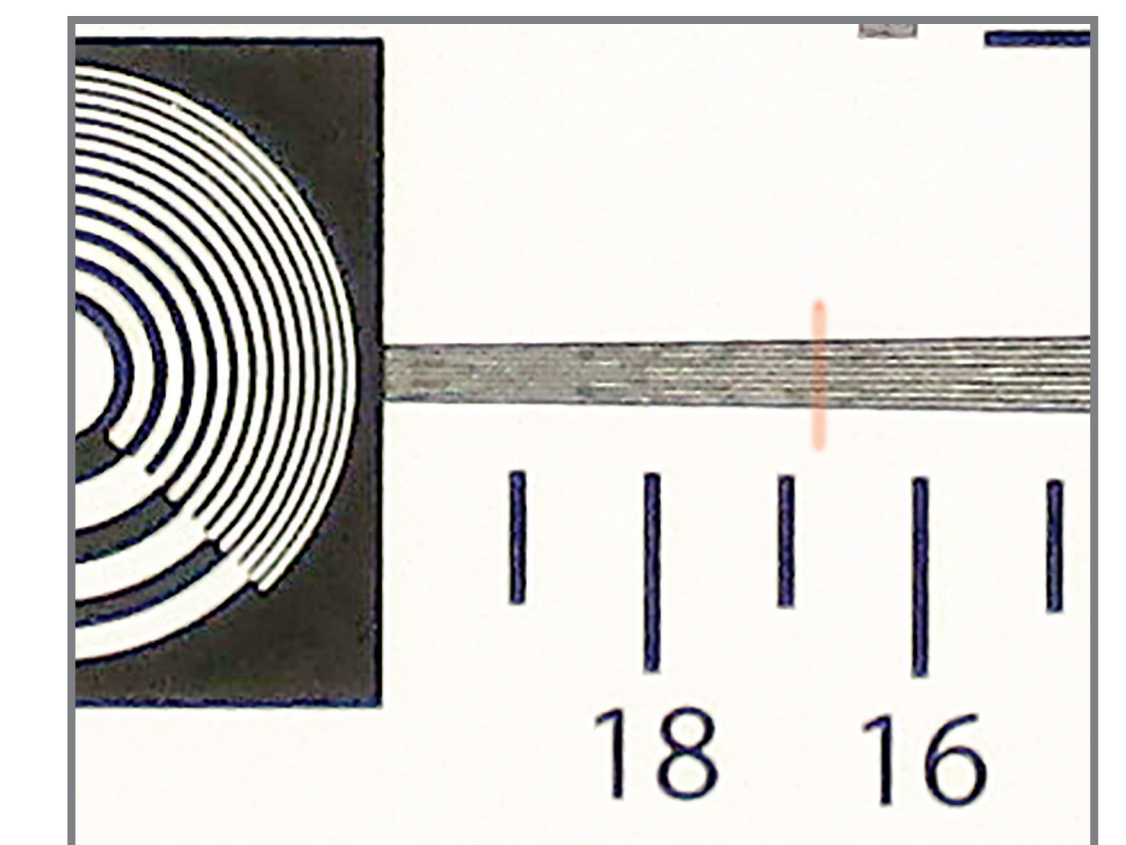


Figure 1.4 - PowerShot RTC Score

* The RTC scores
are identified by a
red mark

* Please note,
these images are
not printed in
original resolution

**This is the full resolution chart
The 9 lines are located in the red square**

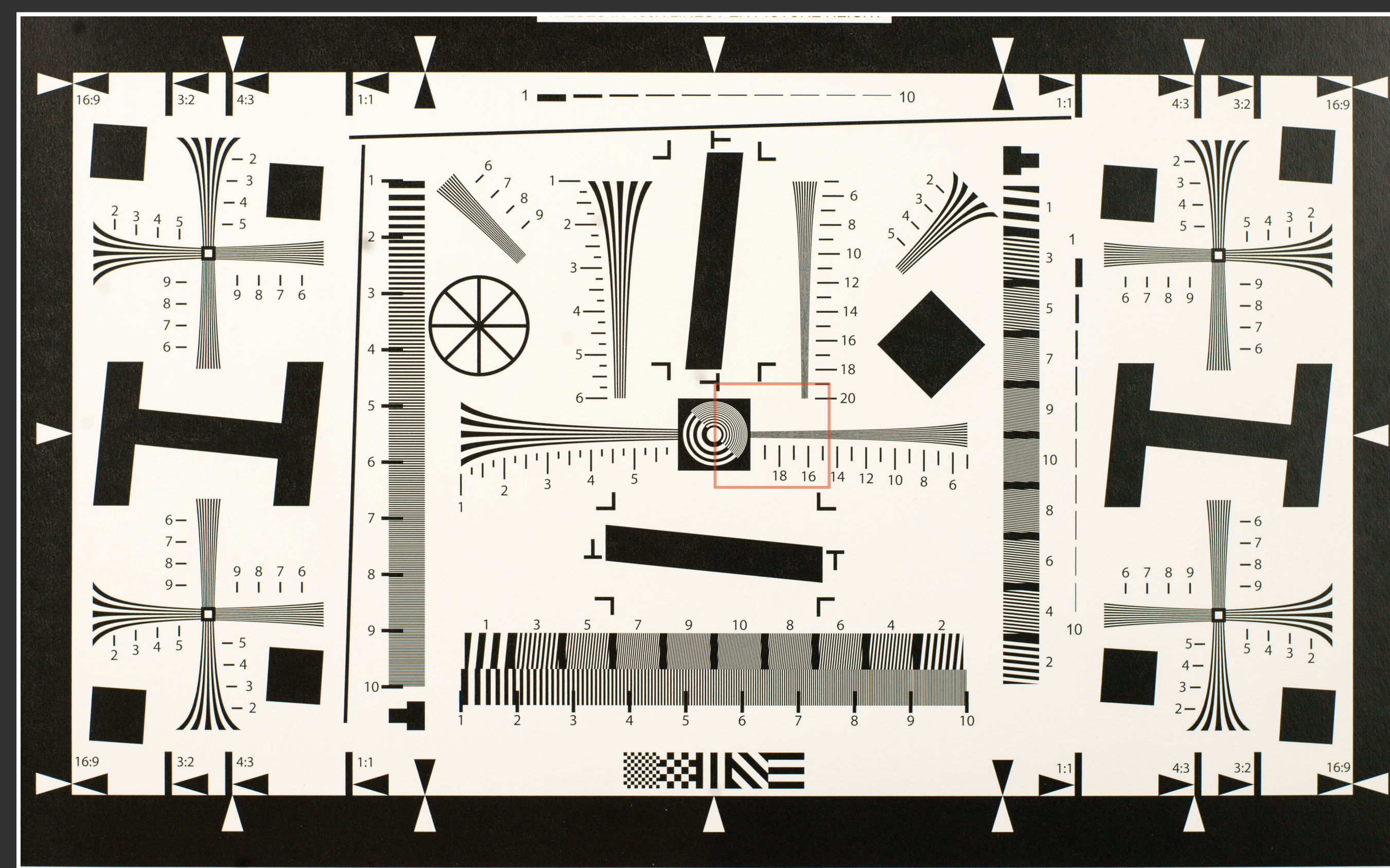
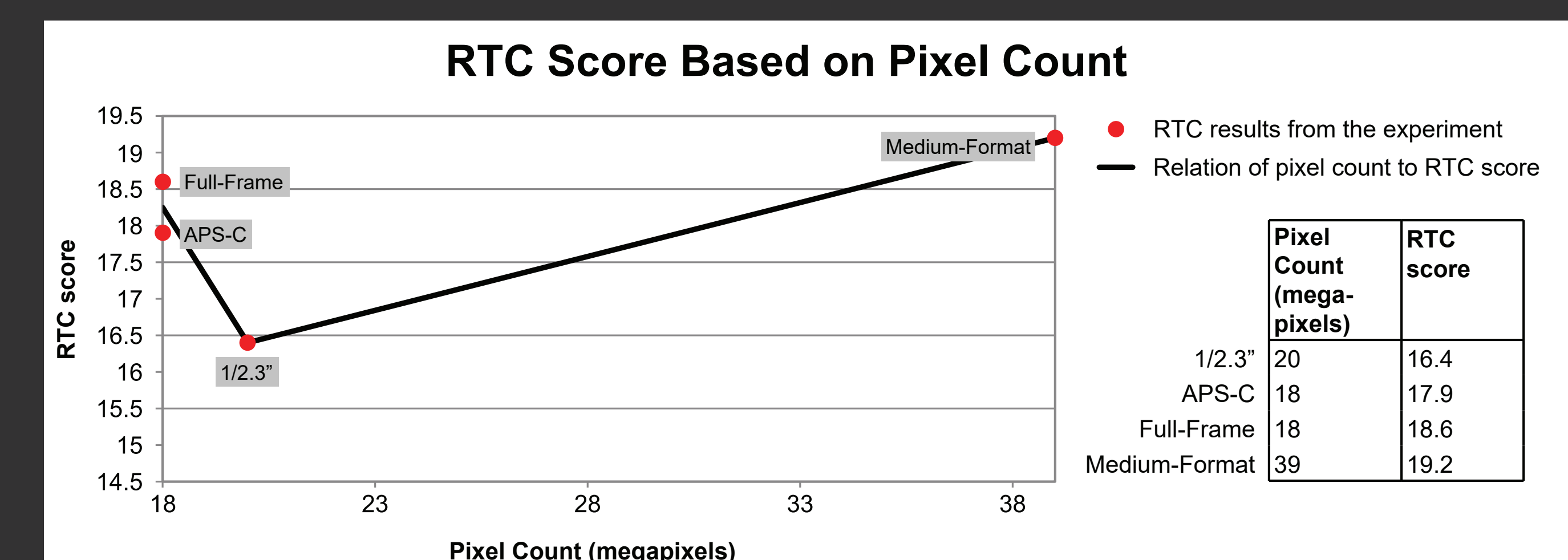


Figure 1.5 - Full ISO Resolution Test Chart 12233 (Hasselblad)

**Graphs were generated to show the
relation between pixel count/pixel size
and the resolution scores (RTC Score)**

**The graphs show a positive correlation
between pixel size and resolution but
show no correlation between pixel count
and resolution**

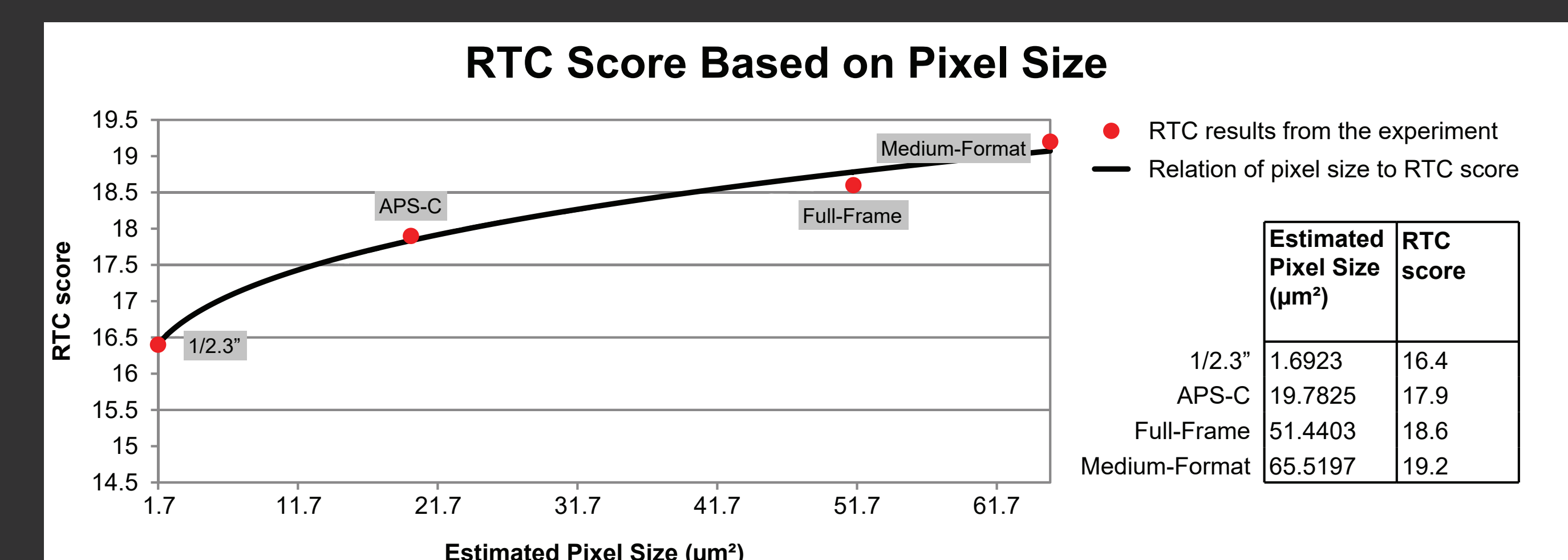
**Conclusion:
When purchasing your camera, consider
the actual size of each pixel over the
total number of pixels**



* The chart used is the
ISO Resolution Test
Chart 12233 which was
developed by Cornell
University

* The photos were
taken in a controlled
environment where
lighting, lens type, focal
length, camera distance,
image composition,
image format, and
editing procedures were
carefully monitored

* The individual pixel
size was estimated for
each sensor by finding the
surface area of the
sensors and dividing the
surface area by the total
number of pixels



References

- Crisp, Simon. (2013) Camera sensor size: Why does it matter and exactly how big are they? New Atlas <https://newatlas.com/camera-sensor-size-guide/26684/>
- My Curve Fit. (2018) Online Curve Fitting. <https://mycurvefit.com/>
- Westin, Stephen. ISO Resolution Test Chart 12233. Ithaca, NY 14850: Cornell University



* Scan to read the full
report on this research