

Re: ASTRO SAA Re: Question about telescope design.

Source: <http://sci.tech-archive.net/Archive/sci.astro.amateur/2008-01/msg00597.html>

- *From:* markzoom@xxxxxxxxxxxxx
 - *Date:* Sat, 26 Jan 2008 17:16:50 -0800 (PST)
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On 27 Jan, 01:53, Chris L Peterson <c...@xxxxxxxxxxxxxxxxxxxx> wrote:

On Sat, 26 Jan 2008 13:00:49 -0800 (PST), markz...@xxxxxxxxxxxxx wrote:

It's quite expensive to make a large mirror. This could be metres across at a fraction of the cost.

In fact, large mirrors aren't all that expensive in the big picture. Big mirrors also require big, expensive tracking systems. And your suggested strip mirror is going to require a complex and expensive `_active_` mounting system, in contrast with good 2D mirrors that require only passive mounts (especially when they are altaz mounted).

It seems illogical to me to try and reflect a 2D image onto a 2D camera sensor array and then convert it through 1D back to 2D electronically to end up on your puter screen. The sensor might as well be 1D/single-dimensional (or a pixel's width by whatever height, anyway). It's only because human eyes can't store the previous raster lines that we desire 2D all at once. Well the computer can store the other lines for you now, to make a picture.

In the end, you have to ask yourself what advantage a 1-D imaging system obtains.

A fraction of the weight and hence a larger size.

You could get the resolutions of large mirror telescopes at a fraction of the cost.

Better digital resolution. If you think of a megapixel but all in a line, that could potentially be the vertical resolution alone. The horizontal resolution depends on how well the tracking is done: By tilting the telescope or by moving the sensor on it's own a small distance.

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It is vastly less sensitive than a 2-D system.

No it's not, It's as sensitive as any rectangular digital camera sensor chip would be, it all just happens to be in a strip.

I did a google of "flatbed scanner sensor" and here is some chap just waving a cheap flatbed scanner sensor by hand (top pic):

<http://www.sentex.net/~mwandel/tech/scanner.html>

You'll see that he later achieved 1000dpi resolution with his woefully crude wooden setup (1 cent pic) and his scanner was in no way designed for what he was doing.

Here are some proper pics he took with his amateurish rig:

http://www.sentex.net/~mwandel/tech/scanner_pix.html

If that's what can be done with his setup, think what purpose designed gear could do.

Consider a
typical astroimage that is 1K x 1K.

That sounds woefully low. Modern consumer flatbed scanner sensors are 4800 dpi wide. I don't know how that translates to pixels but it sounds substantially more than just 1k for one column:

<http://www.photo-i.co.uk/News/Sept04/Canon%20scanner.htm>

It will take 1000 times longer to construct that using a 1K x 1 linear detector. Most drift scan systems use 2D optics and a 2D sensor, and shift the image across the sensor in time with the sky movement, to achieve longer effective exposure times. But you couldn't do this with a strip mirror. Engineering issues aside, the system you propose would simply not be very useful because of its huge inefficiency.

I disagree. For a start 1k is pretty low for a linear detector. Secondly, I see no reason why a drift scan can't be done with a linear detector, (yes it would take longer, but not 1000 times) You could get the resolutions of large mirror telescopes at a fraction of the cost.

If you follow some links on the above pages and do some googles for digital scan/scanning cameras you'll find some are capable of pictures measured in hundreds of megapixels.

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Chris L Peterson
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