

Re: Beam expander and focusing system for scanning head

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From: Jamie Carter (jacarter3_at_onebox.com)

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Marco,

I have designed three element f-theta lenses that maintained spot size over about +/-12 degree scan angles. These were small optics for applications that scanned a limited physical distance. Larger versions have been made that used rectangular aperture lens elements for large scan distances without huge circular lenses.

Your application in the LWIR limits the choice of materials that can be used and these are generally quite expensive (material and fabrication). Does this system scan in two axes? What is the actual scan angle range? What calibrated focal length are you trying to achieve (calibrated focal length is the slope of the f-theta distortion curve)?

Fortunately, your application is narrow band (depending on the flavor of the CO2 laser); so the design may be straight-forward. Not to mention that these elements may be diamond turned and allow for more complicated surfaces in a simpler package. I do not have any experience with the GSI Lumonics product that Leonard alludes in his post. They must have had a reason to move a lens with a galvo, but I can't fathom a reason for this without a lot more information.

There are many vendors that market scan lenses and scan systems. You might check with the Lincoln Laser Co., they specialize in polygonal scanners, but also have experience in the optical design of scan lenses.

James Carter

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marco@marylon.com (Marco) wrote in message
news:<ae17182d.0410041335.6c8121b8@posting.google.com>...
> Hi, thanks for help. I'm an electronic enginner working in the
> automation idustry, where I have to deal with lasers and scannig
> heads. I've been asked, as I'm getting deeper inside optics by my own,

sci.optics: Re: Beam expander and focusing system for scanning head

- > to take a look to a pre-focused scanning head project made few years
- > ago for a CO2 laser. The system has three elements, a moving biconcave
- > followed by a closed doublet with a meniscus and a plano-convex ZeSe
- > lenses, but has not been done for constant spot size all over the
- > field. I'm trying to get some tips, suggestions or whatever to, on one
- > side, learn the way such a constant spot size configuration should be
- > done and, on the other side, to better understand optics. I ask you
- > even more, some titles you think I should read to build good optics
- > knowledge funded on solid basis, at the moment I'm reading Smith,
- > Fischer, Hecht, Pedrotti, Siegman, I've got Born-Wolf as a reference
- > and look forward to get Goodman.
- > Thanks, Marco