

# University of North Carolina

April 8, 2002

Mr M H Miller, Chairman, DVLA Vision Panel  
C/o David Jamieson MP,  
Parliamentary Under-Secretary of State, Transport  
Zone 6J4  
Department for Transport, Local Government and the Regions  
Eland House, Bressenden Place, London SW1E 5DU UK

Dear Sir:

It has been brought to my attention that your committee will soon be considering the Ocutech Autofocus Bioptic Telescope, for its fitness for the purpose of allowing the visually impaired to drive in the UK. As co-developer of all of the Ocutech bioptic telescopes including the autofocus, and as a low vision rehabilitation specialist for over 25 years in the US, it has been suggested that my perspective on these issues might be of interest to your committee.

The entire issue of using miniature telescopes mounted into the top of spectacles (bioptic telescopes), which allows the user to alternate their vision between the regular eyeglass lenses (the carrier) and the telescope itself, remains controversial even here in the US. In my opinion, this is largely due to misunderstandings regarding how the devices are used, which relate to their narrow field of view, the blind spot that surrounds the eyepiece called the “ring scotoma,” and focusing issues.

I would like to address each of these issues after a short discussion of how bioptics are in reality used by drivers.

Bioptic telescopes, just like binoculars, enlarge images, though their value to the visually impaired for driving is not to see things larger, but to see them further away. The difficulty that the visually impaired encounter while driving is that they must get so close to a sign or signal that there is not sufficient time for them to make the appropriate driving adjustments. The telescope lets them see the target further away, giving them more time to react. In practice, the telescope will increase the individual’s ability to see further away by a factor of the power of the device, so that a 4x telescope will allow the user to see what might normally be seen at 10 meters, for example, to be seen at 40 meters—a 4 times performance gain.

While driving, bioptics are used in very much the same way that we all use side and rear view mirrors— for spotting purposes and for brief periods of time—though forward rather than to the sides and behind. Automobile mirrors are quite small, and in fact provide rather narrow fields of view themselves, quite comparable, in fact, to the field of view through a bioptic telescope. When we all first started driving most of us found mirrors to be difficult to use, preferring to turn our heads to make certain that the way was clear. Over time, using mirrors became easy and

natural, and ultimately indispensable. This “learning curve” is also experienced when using bioptic telescopes.

Field of View: Biotic telescopes are available as either small, Galilean versions which offer rather narrow fields of view—about 5 degrees at 3x power, and Keplerian telescopes, which offer significantly wider fields of view—about 12 degrees at 4x—but which are much larger and heavier. The most frequent complaints users voice regarding telescopes are their narrow fields of view, weight, appearance, and the need to focus. Ocutech’s involvement in this field has been to design improved bioptic telescopes that address these issues, and we are proud to have produced expanded field telescopes that are lighter, less conspicuous, and easier to focus (with one version, of course, that is autofocus).

However, whether one considers Ocutech devices or those from other manufacturers, the principles of use for driving remain the same—the driver sights through the device for very short periods of time, no longer than those required to use mirrors, and as a result the narrow field of view is largely irrelevant, though I feel strongly that the Keplerian versions (manufactured by several firms including Ocutech) are the preferred optical design. The remaining time, the individuals are driving using their conventional vision which is more than adequate to see cars, stay in lane, change lanes, make turns and avoid obstacles.

The Ring Scotoma: The concern arising from the blind spot that surrounds the eyepiece is that the driver might miss obstacles (especially people) while they are looking through the telescope. This would certainly be of concern if the individual were to be looking through the eyepiece all of the time, but as we discussed above, this is not the case. In fact, drivers divert their attention frequently such as when adjusting the radio, heater, air conditioner, or window and these are certainly greater attention diversions than those experienced for the short periods of time while sighting forward through a telescope. As a result, I feel that this is largely a false issue.

Focusing: Telescopes can either be fixed focus, manual focus or autofocus. When users will be sighting through the telescope for driving, they will most certainly be looking at distances greater than 6 meters away (closer than 6 meters can be seen with their normal vision). Beyond 6 meters most bioptic telescopes are at “optical infinity,” meaning that they do not need to be focused, as everything will be sharp from 6 meters and beyond. As a result, if the sole purpose of a bioptic device is for driving, then a fixed or manual focus device is all that would be required.

However, bioptic telescopes have applications beyond driving—in stores, classrooms, at work, while traveling, visiting museums, etc., distances closer than 6 meters—where focusing becomes important, and where, on occasion, autofocus becomes desirable if not necessary. As a result, a visually impaired driver might elect to obtain an autofocus device for these other applications and still use it while driving, though it would not be necessary or desirable for it to be turned on (one can still see through the autofocus telescope when it is off, it just won’t change focus).

Questions have arisen regarding the need to see the dashboard while driving, and the value of autofocus for this application, as no other bioptic device could offer that functionality while keeping the hands free to operate the car. In my opinion, this is not a compelling argument for the autofocus, as most autofocus devices, be it cameras, videos or our device, have some difficulty focusing consistently through glass such as the windshield. This is the reason that Ocutech suggests it be set to infinity and be turned off for such activities. Under these conditions, the autofocus is as compelling a bioptic telescope for driving as any other device might be. The need to see the dashboard can be addressed in other manners.

The ultimate decision regarding the fitness of any individual to drive requires a range of considerations. It is not my purpose to suggest a blanket recommendation regarding bioptic driving for the visually impaired, but rather to present my perspective on how these devices are used for driving, how they have been shown to be of value for some individuals, and how the autofocus fits into such considerations.

I hope that this letter has been of some value. Please feel free to contact me regarding any additional information you may desire. I will be most happy to be of service.

Sincerely,

Henry A. Greene, O.D.  
Clinical Professor  
Director, Low Vision Service  
Department of Ophthalmology, School of Medicine  
University of North Carolina at Chapel Hill