

NATURAL 3D VIEWING

(FOURTH EDITION)

Stephen Dring

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e-mail: stephen4dring@gmail.com

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1. INTRODUCTION

A human mind has a natural ability to convert 2D imagery into visions that are seen as natural 3D imagery. There exists a single eye viewing method that converts 2D imagery into visions that are seen as a single eye viewing version of natural 3D imagery.

2. NATURAL 3D IMAGERY

We live in a 3D World. A human eye sees the 3D World in 2D imagery. The separation distance between the left and right eye results in each eye viewing the 3D World from a different perspective viewing angle. A human mind has a natural ability to use the left and right eye perspective view difference details to create 'live' visions of the 3D World that are seen as natural 3D imagery.

3. SINGLE EYE VIEWING OF THE 3D WORLD

A visually impaired person, having vision in only one eye, supplies the mind with 'live' 2D imagery of the 3D World, as seen by the single eye. Where a person is moving their body position, e.g. walking, the 2D imagery details reaching the mind are continually changing. A human mind has a natural ability to use the changing 2D imagery details to create 'live' visions of the 3D World that are seen as a single eye viewing version of natural 3D imagery. Where a person keeps their body motionless, the 2D imagery details remain unchanged and a human mind will create 'live' visions of the 3D World that are seen as 2D imagery.

The 'live' vision of the 3D World is seen switching between a single eye viewing version of natural 3D imagery and 2D imagery. The switch depending upon the presence, or not, of 2D imagery changes, at the moment of viewing.

4. SINGLE EYE VIEWING OF 2D SCREEN IMAGERY

The single eye viewing method detailed in 3., can be adapted for viewing 2D screen imagery, e.g. - television, monitor, laptop, tablet, mobile phone, cinema, exhibition large screen arrays, electronic billboard, gaming console.

The natural ability of a human mind uses the 2D screen imagery to create visions that are seen switching between a single eye viewing version of natural 3D imagery and 2D imagery.

The adapted viewing method may be used by anyone having good vision capability in at least one eye. Two viewing conditions have to be met for the adapted viewing method to work.

4.1 VIEWING CONDITION 1

The adapted viewing method requires the mind to receive 2D screen imagery that captures imagery change details.

The changes may result from camera movement, time lapse photography or subject movement.

Suitable 2D videos may be found on the internet, e.g.:-

Aerial drone footage.

Transport journeys, e.g. view from the cab of a train.

Walking tours of places of interest, e.g. cities, holiday resorts, museums.

Amusement park rides.

Gaming videos.

4.2 VIEWING CONDITION 2

To replicate single eye viewing, the mind must receive 2D imagery from only one eye at any moment in time.

A visually impaired person, having vision capability in only one eye, meets this condition by default.

A person having vision capability in both eyes, needs to use a viewing aid to restrict their vision to single eye viewing. There is a choice of two viewing aid design, passive and active. Each aid uses a different working method to achieve the required viewing condition.

4.2.1 PASSIVE SINGLE EYE VIEWING AID

A viewing aid that permanently prevents the 2D screen imagery from reaching one eye.

The vision of the single eye is natural viewing quality. It is unaffected by polarised light conditions and there is no tinting applied to the vision colours. The aid has a universal capability of viewing any source of 2D screen imagery.

A passive viewing aid can take the form of a number of design options, include the following:-

- A temporary method is to close one eye, the eyelid working as the viewing aid. Prolonged eye closure may result in facial discomfort.
- Another temporary method is to use your hand or blank paper/card to cover the facial area around one viewing eye. The covered eye may remain open, but must not see the 2D screen imagery (Fig 1).
- The wearing of an eye patch.
- The wearing of a lazy eye patch over one lens of prescription viewing glasses (Fig 2).
- The design of a punched card viewing frame with one viewing aperture (scratch built example Fig 3). Suitable for use as an inexpensive single use disposable/recycleable viewer for use at exhibitions and promotional media events, etc.
- Use any style of spectacle frame. Use black paint to cover the outer surface of one lens, or card to cover one viewing aperture. e.g.:-
 - Party spectacles (Fig 4.)
 - Inexpensive non-polarised sunglasses.
 - Inexpensive prescription glasses (Fig 5).
 - Inexpensive magnifying reading glasses for viewing hand held tablet/smartphone.



Fig 1



Fig 2



Fig 3



Fig 4



Fig 5

4.2.1.1 GENERAL VIEWING GUIDELINES FOR PASSIVE SINGLE EYE VIEWING AID

To avoid discomfort, ensure both eyes remain open wherever possible.

The obscured eye's natural movements should not be restricted.

It is acceptable for the obscured vision eye to experience surrounding light conditions, but the eye must never see the 2D screen imagery.

Wear any prescription glasses necessary to view the screen imagery.

Wear viewing aid glasses as overglasses.

4.2.2 ACTIVE SHUTTER VIEWING AID

The viewing aid enables both eyes to view the 2D screen imagery, resulting in the natural ability of the mind to create visions of the 2D screen location and surrounding 3D World, that are seen as natural 3D imagery.

An active shutter operation ensures that the mind receives the 2D screen imagery, from only one eye, at any moment in time. The alternating left and right eye 2D screen imagery is seen to occupy the same location on the 2D screen. The mind interprets the alternating 2D vision as being a source of single eye 2D imagery.

The use of the existing product 3D DLP Link Active Shutter Viewing Glasses will provide the required active shutter operation. Switching the glasses ON starts the shutter operation, which continues until the glasses are switched OFF.

4.2.2.1 USAGE LIMITATIONS OF 3D DLP LINK ACTIVE SHUTTER VIEWING GLASSES

Existing product 3D DLP Link Active Shutter Viewing Glasses use polarised light LCD lens technology.

A 2D screen may use polarised light to improve the clarity of the imagery.

The active shutter viewing method will only work where the LCD lenses and the 2D screen polarised light conditions are compatible.

There are two variants of 3D DLP link shutter viewing glasses on the market. Each variant having a different LCD lens polarised light orientation (90 degree difference). Despite the option of using either variant, there remain a significant number of 2D screen devices that are not compatible with the use of LCD polarised light lenses.

There appears to be no industry standard for 2D screen polarised light orientation.

Devices having portrait and landscape orientation viewing capability, e.g. tablets, smartphones, will suffer with incompatible viewing imagery problems.

Where viewing compatibility is an issue, the solution is to use a passive single eye viewing aid (see 4.2.1).

4.3 SINGLE EYE VIEWING METHOD - PROS

- The method achieves a single eye viewing version of natural 3D imagery, when viewing 2D screen imagery. The method uses the natural ability of the mind to convert 2D imagery into visions that switch between a single eye viewing version of natural 3D imagery and 2D imagery.
- The viewing method may be used by anyone having good vision capability in at least one eye. A visually impaired person may achieve, for the first time, the ability to see natural 3D imagery on a viewed screen.
- The viewing aids are portable and may be used at any location to view past, present and future 2D screen imagery appearing on a television, monitor, laptop, tablet, mobile phone, cinema, exhibition large screen array, electronic billboard, gaming console screen, etc.
- The viewing option is future proofed. Using the mind's natural ability, ensures the viewing method will always be an achievable viewing option.
- The maximum imagery resolution viewable is only limited by the human eye resolution capability.
- A passive single eye viewing aid has universal viewing capability. It can be used to view any 2D screen.

4.4 SINGLE EYE VIEWING METHOD – CONS

- The active shutter viewing aid LCD lens polarised light condition will only work with compatible 2D viewing screens. This results in a significant number of 2D screen devices that are not compatible with the use of LCD polarised light lenses.
- The LCD lenses apply a tint to the vision imagery.
- The use of active shutter viewing may result in visual discomfort for some people. In this event, using a passive single eye viewing aid is a solution.
- The use of a passive single eye viewing aid is not an acceptable method for everyone.
- The passive single eye viewing aid limits the field of vision.

5. AUTHOR'S COMMENTS

The single eye viewing of natural 3D imagery has always been an achievable method; a person wearing an eye patch will automatically experience natural 3D imagery if the viewed 2D imagery meets viewing condition 1. The viewing method knowledge is considered to be in the public domain.

Since the invention of cinema and television, persons having viewing ability in both eyes, have had to endure viewing 2D television/screen imagery representation of the 3D World.

The adapted single eye viewing method provides a viewing option that achieves the unexpected result of natural 3D imagery. It is a viewing ability option that is worthy of use for the 21st Century.