

NATURAL 3D VIEWING

(FIFTH EDITION)

Stephen Dring

First edition July 2024
Second edition August 2024
Third edition October 2024
Fourth edition November 2024
Fifth edition February 2025

Copyright © Stephen Dring 2024
e-mail: stephen4dring@gmail.com

The right of Stephen Dring to be identified as the author of this work has been asserted by himself
in accordance with the Copyright, Design and Patents Act, 1988

CONTENT

TITLE	PAGE
1. INTRODUCTION -----	4
2. NATURAL 3D IMAGERY -----	4
3. SINGLE EYE VIEWING OF THE 3D WORLD -----	4
3.1 VIEWING DEMONSTRATION OF SINGLE EYE VIEWING OF THE 3D WORLD -----	4
4. SINGLE EYE VIEWING OF 2D SCREEN IMAGERY -----	4
4.1 VIEWING CONDITION 1 -----	4
4.2 VIEWING CONDITION 2 -----	5
4.2.1 PASSIVE SINGLE EYE VIEWING AID -----	5
4.2.1.1 GENERAL VIEWING GUIDELINES FOR PASSIVE SINGLE EYE VIEWING AID -----	5
4.2.2 ACTIVE SHUTTER VIEWING AID -----	5
4.2.2.1 USAGE LIMITATIONS OF 3D DLP LINK ACTIVE SHUTTER VIEWING GLASSES -----	6
4.3 VIEWING DEMONSTRATION OF SINGLE EYE VIEWING OF 2D SCREEN IMAGERY -	6
4.4. SINGLE EYE VIEWING OF 2D SCREEN IMAGERY - PROS -----	6
4.5 SINGLE EYE VIEWING OF 2D SCREEN IMAGERY – CONS -----	6
5. AUTHOR'S COMMENTS -----	7
5.1 MY TIME-LINE HISTORY OF SINGLE EYE 3D VIEWING METHOD DISCOVERY -----	7
6. EPILOGUE -----	8

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' visions of the 3D World are 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.

3.1 VIEWING DEMONSTRATION OF SINGLE EYE VIEWING OF THE 3D WORLD

With both eyes open, commence walking. The visions you see of the 3D World appear as natural 3D imagery. Stop walking, keep your body and head still, you can let your eyes wander. The visions you see of the 3D World appear as natural 3D imagery.

Keeping your body and head still. Close one eye. You can let the viewing eye wander. The visions you see of the 3D World appear as 2D imagery.

Keeping one eye closed, continue walking. The visions you see of the 3D World appear as a single eye viewing version of natural 3D imagery.

Conclusion - Single eye viewing of the 3D World results in visions that are seen switching between a single eye viewing version of natural 3D imagery (where body movement changes the perspective view imagery) and 2D imagery (where there is no body movement).

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 array, electronic billboard, gaming console.

The adapted viewing method can be used by anyone having good vision capability in at least one eye.

The visions created by the natural ability of a human mind are seen switching between a single eye viewing version of natural 3D imagery and 2D imagery.

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 periods of changing imagery 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.

The preferred option is to use the active shutter viewing aid wherever possible.

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, promotional media events, etc. For alternate eye viewing option, bend the frame arms accordingly.
- 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 the viewing aid glasses as overglasses.

4.2.2 ACTIVE SHUTTER VIEWING AID

A viewing aid that has both eyes viewing the 2D screen imagery. The natural ability of the mind creates 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.

Existing product 3D DLP link active shutter viewing glasses can be used as an active shutter viewing aid. The viewing glasses have liquid crystal display lenses that use polarised light technology to achieve the active shutter operation.

Switching the glasses ON starts the shutter operation, which continues until the glasses are switched OFF. Scientific details of active shutter operation working can be found on the internet. e.g.

https://en.wikipedia.org/wiki/Active_shutter_3D_system

www.britannica.com/technology/liquid-crystal-display

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 aid will only work where the LCD lenses and the 2D screen polarised light conditions are compatible.

There are two variants of 3D DLP link active 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 use of a passive single eye viewing aid is a solution (see 4.2.1).

4.3 VIEWING DEMONSTRATION OF SINGLE EYE VIEWING OF 2D SCREEN IMAGERY

Select to view a 2D video that contains periods of captured imagery changes, resulting from camera movement. Suitable videos on You Tube include:- Aerial drone footage, Transport journey e.g. the view filmed from the cab of a train, Walking tours of places of interest.

Close one eye to achieve single eye viewing.

The imagery you see will switch between a single eye viewing version of natural 3D imagery (for periods of camera movement viewing) and 2D imagery (for periods of static camera viewing).

4.4 SINGLE EYE VIEWING OF 2D SCREEN IMAGERY - PROS

- The adapted viewing method uses the natural ability of a human mind to convert 2D screen imagery into visions that switch between a single eye viewing version of natural 3D imagery and 2D imagery.
- The adapted viewing method can be used by anyone having good vision capability in at least one eye. It enables every viewing person in the world to experience natural 3D imagery on a 2D 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 single eye viewing method 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 source of 2D screen imagery.

4.5 SINGLE EYE VIEWING OF 2D SCREEN IMAGERY - CONS

- The active shutter viewing aid LCD lens polarised light condition will only work with compatible 2D polarised 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 (see 4.2.1).

- 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

Single eye viewing of the 3D World has always been an achievable viewing method. 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 a 2D television/screen imagery representation of the 3D World. The option of using the adapted single eye viewing method enables every viewing person in the world, to have the ability to convert 2D screen imagery into visions that are seen switching between a single eye viewing version of natural 3D imagery and 2D imagery.

The adapted single eye viewing method is worthy of use for the 21st Century.

5.1 MY TIME-LINE HISTORY OF SINGLE EYE 3D VIEWING METHOD DISCOVERY

1947

I was born in November, one of the post World War 2 baby boom.

2008

I started attending the annual Cockpit-Fest events held at Newark Air Museum. The events are a good opportunity for me to practice my hobby of 3D still photography.

2014

I decided to commence exhibiting my 3D photographs at the annual events. My aim is to encourage visitors to have a go at making their own 3D pictures.

I became aware that some visitors were unable to view my 3D pictures. Talking about their viewing problems and capabilities in general, revealed that a single eye person has a natural viewing ability to convert single eye 2D imagery of the 3D World into visions that are seen switching between a single eye viewing version of natural 3D imagery and 2D imagery. The viewing method results can be easily demonstrated. (See 3.1).

2022

I deduced that the single eye viewing method conditions could be adapted to create a single eye viewing method for viewing 2D screen imagery.

The adapted viewing method only requires a person to have good vision in at least one eye. The adapted viewing method provides every viewing person in the world, the ability to convert 2D screen imagery into visions that are seen switching between a single eye viewing version of natural 3D imagery and 2D imagery. The adapted viewing method requires a person with viewing ability in both eyes, to use a viewing aid to achieve single eye viewing. At this point in time, the only way I knew of achieving single eye viewing was to use a passive viewing aid to permanently restrict the 2D screen imagery from reaching one eye. e.g. The wearing of an eyepatch.

I demonstrate the adapted viewing method at the Cockpit-Fest event. To minimise the risk of contracting Covid, I supplied each visitor with a passive viewing aid in the form of an individually wrapped, single use, paper frame viewing glasses. The glasses were manufactured in China. To allow their use of existing tooling and manufacturing methods, the glasses were made as a variant of the Company's 3D anaglyph glasses design. The left eye red filter lens was omitted to achieve a clear viewing opening and the right eye cyan filter lens was replaced with full black material. In practice, the small size of the paper viewers made overglasses viewing difficult and the small size of aperture window problematic for bi-focal viewing. Some visitors found the need for permanent single eye viewing to be an unacceptable viewing condition for their use. Despite the unexpected viewing problems, the general response from the visitors at seeing the 2D television imagery change to natural 3D imagery was one of amazement. One lady became quite vociferous shouting out "Why don't I know about this!" It made me wonder how many people there are the world unaware of this knowledge. It made me feel morally obligated to ensure the knowledge appears in the public domain; hence the creation of my webpage. I cannot supply a scientific explanation of how the mind works as it does. I can only supply demonstration details (see 4.3) so persons may experience the 3D effect for themselves.

2023

This is the year I had a 'EUREKA' moment (I was in the bath at the time). I remembered that my 3D projector requires the use of 3D DLP Link Active Shutter Viewing Glasses in order to see the projected imagery in 3D. The glasses active shutter operation ensures the mind receives single eye imagery in the form of alternating left and right eye vision. I reasoned the viewing glasses could be used as an active shutter viewing aid to achieve single eye viewing of 2D screen imagery. A quick trial proved my reasoning to be correct. The benefit of the active shutter viewing aid is that it allows both eyes to view the 2D screen and surrounding area, while single eye viewing of the screen 2D imagery is achieved by the electronic active shutter operation.

I took my glasses to the 2023 Cockpit-Fest to demonstrate the active shutter viewing aid to a few friends. One friend has a wonky eye and had previously advised me that he has trouble viewing 3D imagery. When trying the viewing glasses he stated "I've never seen imagery like this before on a television." The feedback from my friends was all positive. Despite the problems encountered with polarised light compatibility, the active shutter viewing aid is the preferred choice of viewing aid for the adapted viewing method.

2024

At the Cockpit-Fest event, I gave my first public demonstration of the adapted viewing method, using 3D DLP link active shutter viewing glasses as the active shutter viewing aid.

2025

Development continues to achieve a universal active shutter viewing aid design that can be used to view any source of 2D screen imagery.

6. EPILOGUE

Should you find yourself viewing 2D screen imagery and you wish to know if it can be seen in natural 3D imagery, just close one eye to experience the answer.