



CFLOU



USER MANUAL LOW VISION SYSTEM

SUMMARY

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Introduction

We created this visual impairment simulator with the aim of raising awareness of the reality of visually impaired people. Raising awareness helps to increase the knowledge of the difficulties and challenges that people with visual disabilities face on a daily basis.

By raising awareness among the general public and institutions, we also aim to promote inclusion and accessibility for visually impaired people.

In summary, visual disability awareness plays a vital role in promoting inclusion, accessibility and respect for people with visual impairments. It contributes to a more inclusive society, where people with visual disabilities can live fully and actively participate in the life of society.

Any movement with the simulator on the head is prohibited without human assistance not equipped with the simulator. In this case, it is necessary to guide the equipped user by positioning yourself in front of them and having them grip your elbow.

Attention : Please do not update Android. CFLOU will not be held accountable if you updated Android apps and the system does not work anymore. The simulator must be used in temperatures between 5°C and 28°C. Outside this range, the simulator's operation is not guaranteed and the device may deteriorate prematurely. The publisher cannot be held liable for any damage, malfunction or deterioration resulting from use outside these conditions.

How to use the headset?

Helmet adjustment

Adjusting the image sharpness:

If the image is not clear, you can manually adjust the positioning of the lenses using the wheel located at the bottom left.

Please leave the location activated on the tablet so that it can find the surrounding LVS.

Turn on the LVS

To turn on the LVS, you must hold the Power button above the headset for 2 seconds (see image below) until a slight vibration is felt, then wait about 30 seconds for the software to start.

It can be turned back on via the same process.



The headset will turn on and launch the application automatically.

It is recommended to put the simulator on standby if you take short breaks (e.g. a few minutes) and to turn it off during a long break (e.g. half a day) to avoid seeing it discharge.

How to change the language?

On the LVS, there are no buttons/keys, but you can still navigate the menu. In the center of the screen, if you aim at the intersection of the two red lines it allows you to select a menu.

To change the language, target the “other options” menu with the “cross”, and stay there, a circle will appear, once the circle is completed. Another menu will open.

On the right, flags are available, as for the previous manipulation, aim for the language that interests you. Once the language is changed, aim for the “Start experiment with a monitor” option to return to the main menu.

How to turn off the headset?

As with turning on the LVS, you have to press the top button for about three seconds.

Please note that if you change the language of your smartphone, this function will no longer work.

How to use the tablet?

Turn on the tablet

To turn on the tablet, you must press the small button on the side for approximately three seconds.



How to use LVS to raise awareness?

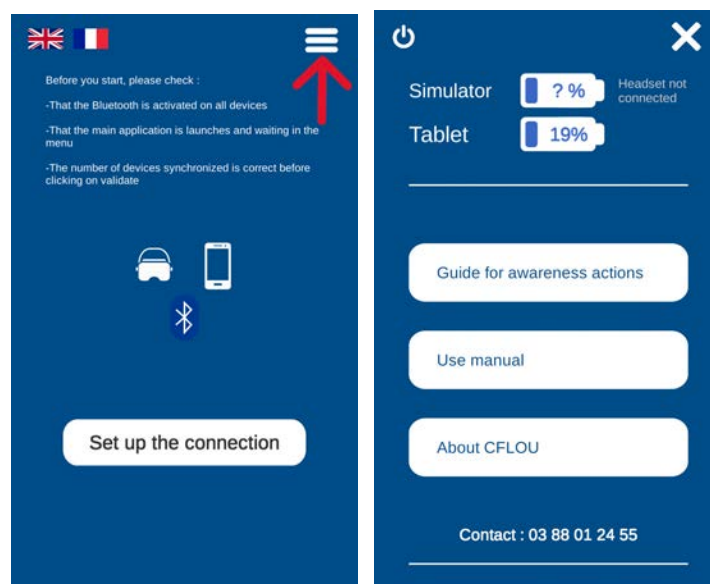
First, you must launch the “LVS remote” application which is located at the bottom of the home page on the tablet.



We then arrive on this page. We can change the language at the top left.

The language change will only be done on the tablet, if you want to change the language on the headset.

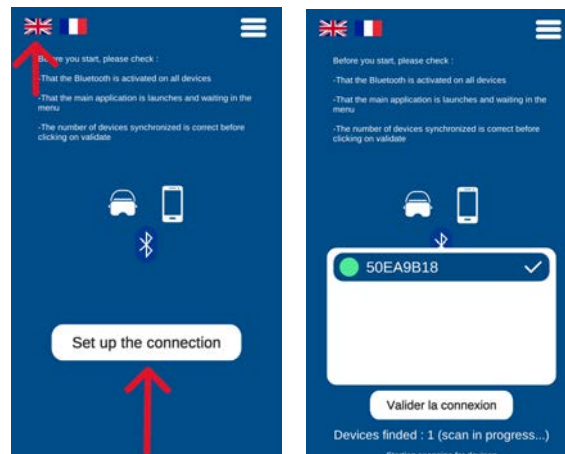
When you click on the three lines at the top right, it takes us to a page where there is several information and menu:



- Battery information for the tablet and connected headset(s).
- The “Awareness Guide” menu where you will find all the pathologies and simulation advice.
- Instructions for use
- About CFLOU

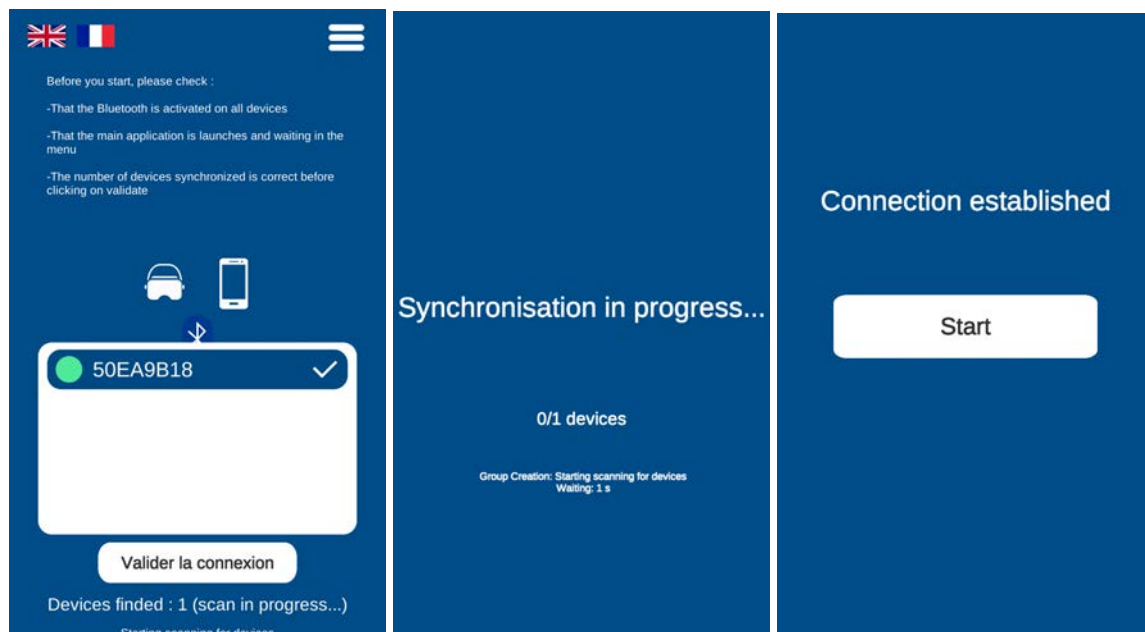
Start awareness

To launch awareness, you must click on “establish connection”



It is absolutely necessary to check that all the headsets are recognized before proceeding to the next action.

Click on the helmet or helmets that interest you. The helmets are easily recognizable with the name and color which can also be seen in the helmet. Then just press “validate connection”. Synchronization will begin, once finished, press “Start experience”.



“Pathologies” field

This is where you will find the settings allowing you to display the different pathologies included in the application on the simulator. Each pathology is adjustable according to its degree of importance. It is possible to combine several pathologies. Please click on the arrow on the bottom of the screen to see more pathologies.



“Visual field abnormalities” field

This is where you will find the settings creating different visual field losses on the simulator.

Hemianopias and Quadrantopias: you can activate only one at a time, the white areas represent the areas of vision that the helmet user will lose.

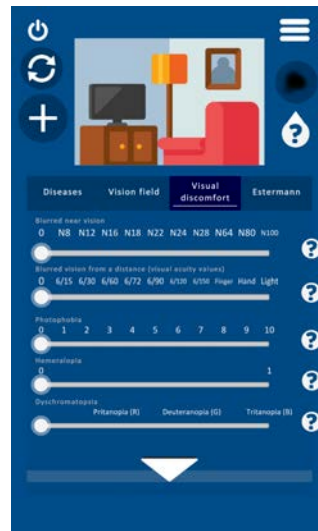
For the three parameters related to “Blurred vision” (near and distance) and to “Photophobia,” you will find the same system as for the pathologies. At level 1, the intensity is low, and at level 10, it is high.



“Visual discomfort” field

This is where you will find the settings creating different visual disturbances on the simulator.

For the two parameters linked to “Blurred vision” and “Photophobia”, you find the same system as for the pathologies. At level 1 the intensity is low and at level 10 it is high.



+ The Plus shaped button

This button makes a cross appear or disappear in the headset user's vision.

On the tablet interface, when there is a cross that appears on the screen, this means that there is also one displayed in the headset.

Question mark buttons

These buttons open a pop-up message linked to the element on its left. It allows you to have succinct information on this same element. To activate and deactivate them, simply click on them once.

The menus

To access the menu, simply click on the button at the top right.

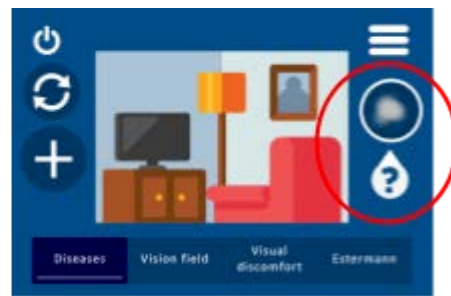
Once in a menu, to return to the main “Filter overview” page of the application, simply click on the cross-shaped button at the top right.

Clicking on one of these choices takes you to the selected page.

Completion phenomenon



Completion not activated



Completion activated

A mechanism through which the brain fills in the missing areas of the visual field by extending textures, colours, and contours. This makes the scotoma less noticeable, especially in regular or patterned scenes. As a result, many scotomas remain unnoticed. The phenomenon is common in AMD, Stargardt disease, hemianopia, and quadrantanopia. This illusion provides no real information and may cause missed letters, facial details, or obstacles. The degree of completion varies greatly between individuals: two identical impairments may be experienced very differently.

Causes:

A normal cortical mechanism, reinforced by uniform scenes (walls, sky, lines of text). Very common in cases of central scotoma or a stable visual field defect.

Consequences:

Underestimation of the visual disability. Skipped words while reading, missed facial details, undetected obstacles. Increased fatigue when visual exploration is insufficient.

Management:

Educate the person and objectify the defect using visual field testing. Train ocular-head scanning. Optimise magnification, contrast, filters, and lighting. For reading, use an eccentric viewing point and tracking aids.

Recommendations:

Completion does not create information: it hides the absence of it. Depending on the individual, the same scotoma may seem to “disappear” or remain disturbing. Strategies must therefore be personalised. Activating completion is recommended in central scotomas (AMD, Stargardt), diabetic retinopathy, hemianopia or quadrantanopia, and in glaucoma with peripheral field loss.

Awareness Guide

Raising awareness can be done in 2 different ways:

1. The first consists of presenting the pathologies with their classic clinical picture, in order to help the general public better understand the disabilities or limitations caused by each pathology and symptom.
2. You can also get as close as possible to a specific clinical picture, allowing families, caregivers and work colleagues to better understand the difficulties that the visually impaired person may face in their daily life.

In this section, you can find additional information regarding pathologies, as well as simulation advice for each of the visual disorders presented in the application.

Pathologies

Dry and Wet AMD

Age-related Macular Degeneration (AMD) is currently the leading eye disease causing visual impairment among elderly people, as it typically appears later in life, most often after the age of sixty. This condition exists in several forms, the two main ones being **atrophic AMD**, also called “*dry AMD*” (without hemorrhage), and **exudative AMD**, also called “*wet AMD*” (hemorrhagic).

The progressive destruction of the macula is characterized by a decrease in visual acuity, slight visual distortions, and eventually the appearance of central scotomas. Peripheral vision, however, remains unaffected.

Simulation tip!

For dry and wet AMD, we recommend that you try to look at the faces of the people around you. Reading a screen or document with several font sizes is also recommended. Remember that you must keep your visual attention on the center of the screen in order to best understand what the person may be experiencing.

Glaucoma

Glaucoma is a chronic disease which today affects 1 to 2% of the population after the age of 40 and up to 10% after the age of 70.

It is caused by progressive deterioration of the optic nerve, which in most cases is due to increased pressure inside the eye. This deterioration will lead to a progressive reduction in vision, initially impacting the periphery of the visual field. It will then gradually extend to its center until a tubular vision is obtained.

Simulation tip!

You can perform all kinds of exercises such as looking at a face or around you, reading a document, writing an email, etc. Pay close attention to the first appearances of blur in the visual field before the arrival of the scotoma.

Retinopathy

Retinopathy is a pathology that results in damage to the retina. Two forms predominate: the diabetic form and the pigmentary form.

Diabetic retinopathy:

It only appears in diabetic people; it is today, in France, "the leading cause of blindness before the age of 65" (federationdesdiabetiques.org).

Diabetic retinopathy causes bilateral damage in most cases. It is caused by damage to the capillary vessels of the retina. It is mainly characterized by the appearance of spots in the central region of vision.

Simulation tip!

Try to look at the faces of the people around you. Reading a screen or document with several font sizes is also recommended.

Important : You must keep your visual attention on the center of the screen in order to best understand what the person may be experiencing.

Pigmentary retinopathy:

It is caused by slow, bilateral degeneration of the retina. It directly affects the rods of the retina. This attack quickly causes night blindness, then a progressive loss of the periphery of the visual field. The person will gradually obtain tubular vision.

Simulation tip!

Try to look at the space around you and familiarize yourself with the environment. You can imagine yourself looking for something or someone. It is also advisable to try operating a computer, reading a document and looking at faces.

Cataract

Cataract is caused by a slow opacification of the lens. It gradually involves a loss of visual acuity, blurred vision, photophobia, and complications in distinguishing colors, relief and contrasts.

Simulation tip!

You can do all kinds of exercises such as looking at a face or around you, reading a document, etc.

Stargardt's disease

Stargardt disease is a form of juvenile macular degeneration, characterized by progressive loss of central vision. It is caused by damage to the macula, the part of the retina responsible for detailed vision. Symptoms include decreased visual acuity, difficulty seeing colors and fine details, and increased sensitivity to light.

Simulation tip!

To simulate the visual experience of Stargardt disease, we suggest engaging in activities that rely heavily on central vision, such as reading or observing details on objects. The helmet recreates the loss of central vision and difficulty perceiving fine details, reflecting the daily challenges faced by people with this condition.

Retinal detachment

Retinal detachment is a serious condition that occurs when the layer of light-sensitive tissue at the back of the eye separates from the inner lining of the eye. Symptoms include flashes of light, floaters, and dark areas in peripheral vision. Treatment depends on the severity of the condition and how quickly it is diagnosed. In short, retinal detachment is a serious eye condition requiring prompt treatment to prevent permanent vision loss. Surgery is commonly used to repair detached retinas, but vision recovery depends on the severity of the condition and how quickly it is treated. Complete vision recovery is possible in some cases, but in others, limited vision or permanent vision loss may occur. Vision rehabilitation is often necessary to help the patient adapt to their new vision.

Simulation tip!

We recommend that you look at your environment.

Albinism

Albinism is a genetic condition resulting from insufficient production of melanin, which affects the pigmentation of the skin, hair and eyes. People with albinism often have reduced vision, high sensitivity to light, and difficulty discerning fine details. Symptoms vary depending on the individual, but may include decreased visual acuity and a propensity for glare.

In brief, albinism is characterized by ocular signs combining major photophobia, greatly reduced visual acuity and nystagmus. Note that there are generally significant refractive disorders.

Simulation tip!

To simulate the visual experience of albinism, we recommend exposing yourself to environments with different light intensities, especially situations with high brightness. While wearing the headset, you will experience increased sensitivity to light and difficulty perceiving details, reflecting the visual challenges commonly experienced by people with albinism.

Visual field abnormalities

Hemianopia

Imagine that your vision is like a television screen. With hemianopsia, it's like half of that screen has suddenly gone black. You can only see half of what is in front of you, to the right or left, depending on which side is affected. This can happen when a part of the brain that controls vision no longer works properly, often after a stroke. People with this condition often have to turn their heads to see what is happening on the other side of their "TV screen." The person suffering from this pathology will, therefore, have difficulty distinguishing people, obstacles or other elements that are in the lost areas of their vision.

Simulation tip!

We recommend that you look at written documents in order to better understand the visual loss. Also look at your surroundings and people's faces.

Quadrantopia

It is characterized by loss of a quarter of the visual field of the eye. These losses are caused by optical radiation damage, implying poor transmission of visual information to the brain. This is very common in cases of severe head trauma.

Simulation tip!

We recommend that you look at written documents in order to better understand the visual loss. Also look at your surroundings and people's faces.

Impairment of Central and Peripheral Vision

Central and peripheral vision impairment involves impairments in the ability to see clearly in the center of the visual field as well as in peripheral areas. This can result from various eye conditions, such as macular degeneration for central vision and glaucoma for peripheral vision. Symptoms include difficulty reading, recognizing faces, and impaired navigation in spaces.

Simulation tip!

To simulate combined central and peripheral vision impairment, we recommend performing activities that require the use of central vision, such as reading, as well as those that rely on peripheral perception, such as moving in a cluttered environment. .

The headset will simulate a loss of clarity in the center of your visual field and a reduction in your peripheral vision, illustrating the challenges faced by people with this type of visual impairment.

Visual impairments

Blur (loss of visual acuity)

Loss of visual acuity refers to the reduced ability of a person to clearly distinguish details, contrasts, and shapes. It generally appears as more or less pronounced blurriness, depending on the degree of visual degradation. We distinguish between:

- **Blurred distance vision**, which reflects the difficulty in recognizing objects, faces, or signs at a distance.
- **Blurred near vision**, assessed using the Snellen scale, which reflects the ability to read or discern details up close, such as text or a smartphone screen.

Visual acuity is always measured after correction (glasses or contact lenses). A decrease may result from many ocular pathologies (cataract, macular degeneration, glaucoma, etc.).

Simulation tip!

- For blurred **distance** vision, we recommend observing a person a few meters away, a sign, or a distant object.
- For blurred **near** vision, try looking at your phone screen, your watch, or a printed text.

Photophobia

Photophobia is defined as an abnormal sensitivity to light. Light sources such as daylight, lighting or reflections will cause visual discomfort, fatigue, eye pain, dry eyes and/or migraines. The symptoms will mainly depend on the level of sensitivity of the person and their environment.

Simulation tip!

We recommend that you mainly look at light areas (documents to read), or with strong brightness such as your screens, lights and windows.

Hemeralopia

Hemeralopia, also known as night blindness, is a visual disorder characterized by difficulty seeing in dim light or darkness, despite having normal vision in daylight. It is generally caused by damage to the retinal rods, which are responsible for night vision, and can be linked to various factors such as vitamin A deficiency, retinitis pigmentosa, glaucoma, cataracts, or certain retinal disorders.

Simulation tip!

We recommend looking around your environment first under normal lighting conditions, and then in the same environment under dimmer conditions (for example, by turning off the light or closing the shutters).

Dyschromatopsia

Dyschromatopsia, more commonly known as color blindness, is a visual disorder characterized by difficulty distinguishing certain colors—most often red and green, and more rarely blue and yellow. It is generally genetic in origin, caused by an anomaly in the retinal cones (the photoreceptor cells responsible for color perception), but it can also be acquired as a result of eye diseases or certain medications.

Protanopia

A form of dyschromatopsia characterized by the absence or dysfunction of red-sensitive cones, leading to difficulty distinguishing red and its shades, often confusing them with green or brown.

Deuteranopia

A similar anomaly affecting green-sensitive cones, resulting in confusion between green and red, with an altered perception of their gradients.

Tritanopia

A rarer form caused by a defect in blue-sensitive cones, leading to difficulty distinguishing blue from green as well as yellow from violet.

Simulation tip!

We recommend looking at everyday objects of different colors: for protanopia, focus on red objects or similar tones; for deuteranopia, look at green or red objects; and for tritanopia, observe blue, green, violet, or yellow objects.

Color vision:

Loss of color vision can be complete in the case of pathology such as achromatopsia. It is due to a malfunction of the cones, this results in gray level vision. This can be very complicated in daily life, when dressing for example. It is often accompanied by a loss of visual acuity.

Simulation tip!

We advise you to look outside and at the clothes of the people around you. It is also interesting to manipulate a telephone or a computer.

Contrast

Contrast disorder is characterized by difficulty distinguishing details in environments where there is little difference in color or brightness between objects and their background.

This affects the ability to read, recognize faces, or navigate complex places. Symptoms vary depending on the level of contrast deficiency and the person's environment.

Simulation tip!

We recommend performing tasks that require seeing details in low contrast conditions.

For example, try reading text where the color of the letters is very close to that of the background, or moving through a space where objects and their surroundings have similar colors. This will highlight the challenges associated with reduced contrast perception.

Nystagmus

Nystagmus is manifested by involuntary and rapid movements of the eyes, which can be horizontal, vertical or rotating.

This condition often causes blurred vision, visual instability, and difficulty focusing on objects. Symptoms and their intensity vary depending on the individual and can be influenced by the direction of gaze and the level of stress or fatigue.

Simulation tip!

We suggest doing activities that require you to focus your gaze, such as reading text or observing objects at different distances. By wearing the headset simulating nystagmus, you experience the sensation of unstable and blurred vision, illustrating the challenges faced by people with this condition in their daily lives.

Personalized field via Estermann

Personalized Field via Estermann uses the results of the Estermann visual field test to simulate visual impairments specific to each user. This test evaluates central and peripheral vision, making it possible to faithfully reproduce visual problems such as scotomas (blind spots) or decreased peripheral vision.

Simulation tip!

We recommend engaging in a variety of activities, such as reading, navigating a complex environment, or observing scenes with great detail. Using the headset configured to your Estermann visual field profile, you will experience specific areas of visual impairment and better understand the unique challenges these limitations can present in everyday situations.