

## Introduction to the VisuALS System

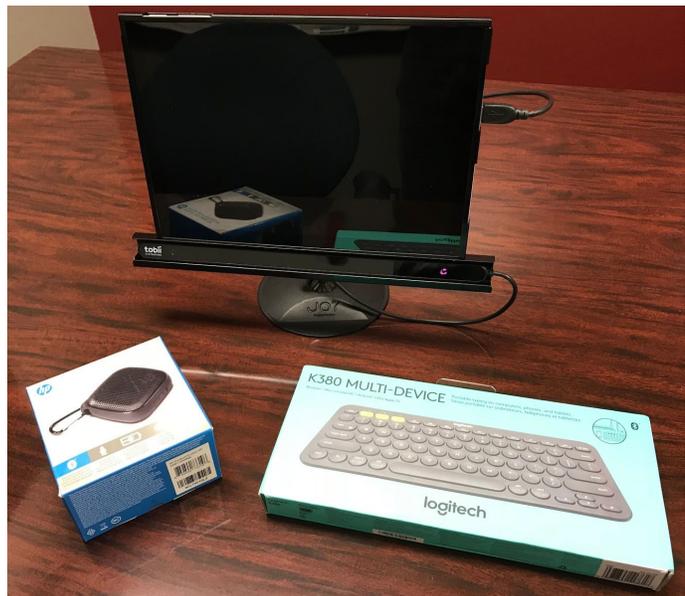
VisuALS is an alternative communications system for those with conditions that make it difficult for them to communicate using traditional means. Those that can't speak can use the text-to-speech functionality. Those that can't use their hands, can use their eyes to type and to control the computer.

The VisuALS system includes both hardware and software components that, together, are designed to be an affordable and easy to use communications solutions for those that we seek to help.

The hardware elements of the VisuALS system include both standard off-the-shelf components, and some custom designed elements. A big part of the value of the VisuALS system is that all these pieces have been researched, combined, and pre-configured for you so that everything works as easily and reliably as possible. We have also focused on choosing components that can keep the initial cost low and that can provide affordable options for your future needs.

The specific hardware components included in the VisuALS system include:

- A Microsoft Surface Pro tablet computer
- A Tobii 4C eye tracking device (this part is purchased separately and configured/integrated with the other parts for you by VisuALS Technology Solutions)
- A custom-designed case to hold the tablet and the eye tracker together
- One or more mount systems to hold the case at the optimal position for your use. Mount options include those for desktop use, for wheelchair use, and for bed use
- A bluetooth speaker to help the user be heard in a noisy environment
- A bluetooth keyboard to make it easier for caregivers to interact with the system when desired



Similarly, the software components in the VisuALS system are a mix of off-the-shelf and custom built applications. Before shipping your system, we take the time to get all of these programs working well together and configured to provide the easiest and best experience “out of the box” for someone simply using their eyes.

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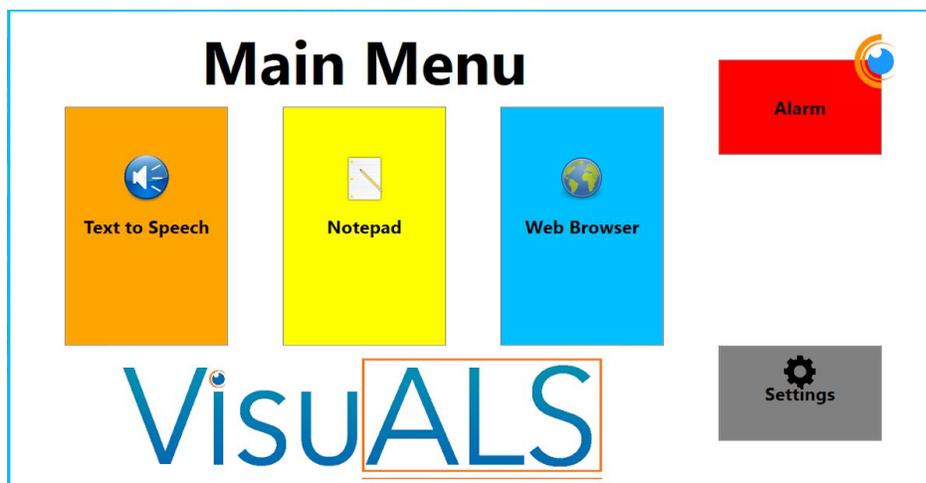
- Microsoft Windows 10
- The VisuALS program
- The Tobii software (this comes with your eye tracker)
- Splashtop remote access software to enable us to easily support you when you have questions or problems

What you will encounter most when using the VisuALS system is the VisuALS program.

Currently, the VisuALS program has five main components (or sub-applications):

- Text to Speech - which enables you to type messages with your eyes and then have the computer speak those messages for you
- Notepad - which allows you to compose longer documents (e.g. speeches), save them, edit them, and - when you're ready - speak them
- Web Browser - through which you can use your eyes to access all of the information on the Internet, including sending and receiving e-mails, and participating in social networks like Facebook
- Alarm - which makes a loud audible tone when selected so that you can get the attention of your caregivers
- Settings - where you can customize how VisuALS works to meet your preferences

These five elements are visible in the main menu that appears when the VisuALS system launches:



To use the VisuALS system, you simply look at what you want to select.

The system uses a concept called “dwell time” to determine when you really want to select something. The “dwell time” is one of the Settings that can be adjusted. The default value is 1 second (or 1000 milliseconds) meaning that, if you keep your gaze on something in VisuALS for 1 second, it will be selected. Many users start with the default setting, or even increase the dwell

time to more than a second to avoid accidentally selecting keys, but as they become more practiced with the system, they shorten the dwell time so that they can type faster and move around the system more quickly.

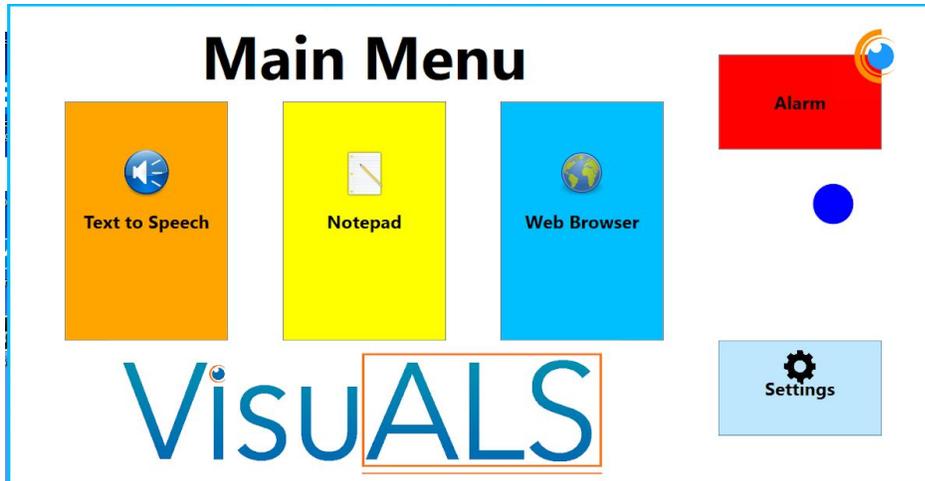
We will talk about specifically how to use your eyes to use each of the sub-applications in their respective tutorials, but to help you understand what we mean, let's explain how to use the main menu. When the menu is on the screen, if you look at one of the big blocks on the menu (e.g. the big orange "Text to Speech" button) for 1 second (if that's what you have dwell time set to), then the system will interpret that as meaning that you want to select Text to Speech and the screen will change to show the Text to Speech application.

So, how does the system know where you are looking, and how do you know where the system thinks you are looking?

Researchers have been working for decades on eye tracking technology. Companies like Tobii have commercialized this technology in products like the 4C. What you notice most about the Tobii are some relatively faint red lights shining out of the front. More important than the red that you see are infrared light waves being emitted that you can't see. These bounce off of your eyes and are reflected back to the 4C. Along the 4C bar there are also multiple cameras tuned to pick up those infrared reflections. Based on the direction of the reflection and other information that the cameras can pick up, the 4C is able to determine where your eyes are, which direction they are pointed, and therefore to be able to determine where on the screen you are looking. It's really amazing - and surprisingly accurate!

But for it to work well, the hardware has to get a good sense for the unique characteristics of your face and eyes. This is done through a quick and painless "calibration" process. Theoretically you do this once and then you don't need to do it again. I think most people get to point where they don't think the 4C is tracking their eyes as well as it used to, and since it's an easy process, they simply re-calibrate. We'll cover how to do this calibration in another tutorial.

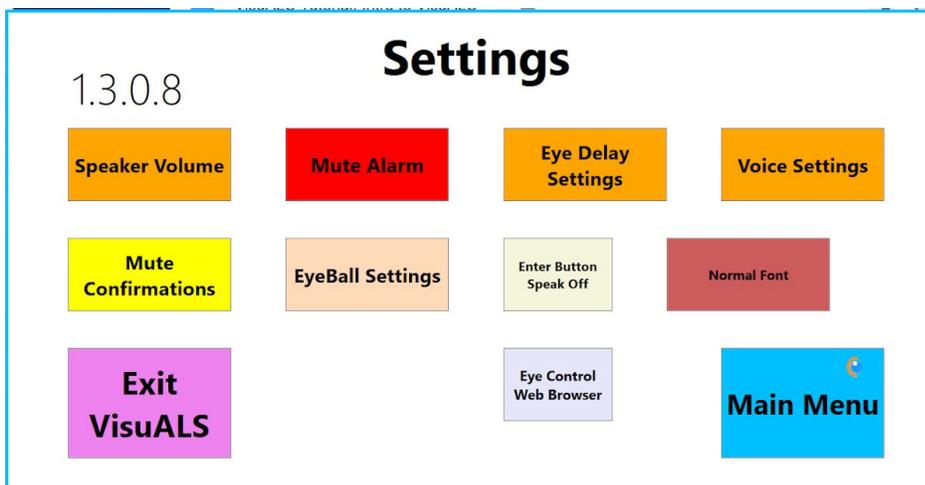
But how can you tell whether the 4C is accurately tracking your eyes? One of the features we've built into the VisuALS software is what we call the "EyeBall". You can turn the EyeBall on and off and change its characteristics (size, colors, and dampening) in the Settings. For the picture below, I made it a pretty big Blue dot so you can see it, but I usually have it much smaller so that it's not a distraction. As I look around the screen, this dot will move around showing me exactly where the 4C thinks I'm looking. This is very helpful when trying to select something on the screen - and if it's not selecting - you can see which way you need to move your eyes to be positioned over the object you want to select.



It is important to note that you don't need to use your eyes to use the VisuALS system. You can actually touch the screen to select items, just like you would with any Windows touch-screen enabled application. When inputting text, you can also use a keyboard, like the bluetooth keyboard included with the VisuALS system. But the main reason that most people want a VisuALS system is because they need the eye control feature.

The final point I want to cover in this introduction is how to exit the VisuALS application. Most VisuALS users almost never quit out of it. Since it is their main connection to the world, they leave it running all the time, so we didn't need to, or even want to, make it easy to (intentionally or accidentally) exit out of the system.

To stop the VisuALS application, go into the Settings menu, and select "Exit VisuALS".



You will then be asked to confirm that you want to exit - and if you do, simply select the "Yes" button.

Please check out our other tutorials to learn more about how to use the VisuALS system!

<b>Are you sure you want to exit?</b>	
<b>Yes</b>	<b>No</b>