



**W.K. KELLOGG
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Agricultural & Life Skills Project

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Module: Soil and water conservation

Gully degeneration

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Localisation documentation

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VR in Africa – for Africa – by Africa



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Gully degeneration i3dlo - LOCALISATION DOCUMENTATION

- ❖ For a background and history to this i3dlo, refer to Section 1 below
- ❖ If you want to get to the **technical localisation detail** of the **i3dlo** - go to **Sections 2 (text translation) and 3 (audio translation)**.
- ❖ If you want to **brush up on how to localise** an interactive3d learning object - go to Annexure 1
- ❖ To see how to embed an i3dlo into your **PowerPoint** presentation, refer to Annexure 2
- ❖ For general information on computer requirements, usage etc, refer to Annexure 3

1 Background

Funding agency W K Kellogg Foundation (**Grant No. P3002256**)

Project partners This project has two main partners, **World Links** who focus on the testing of localisation procedures, translating the material into commonly used Zimbabwean languages as well as downstream implementation through their community centre network; and **the Naledi3d Factory**, responsible for the visual content development

This i3dlo forms part of a rural development and farming skills development project that addresses the following:

- Help rural communities better understand and, therefore, be better empowered to address local issues that impact on rural development – and in this case, focusing on agricultural and other life-skills development and in a way that **modernises** local practice, without necessarily **westernising** these practices
- Demonstrate the use of VR-based learning content and especially the use of Interactive3d Learning Objects (i3dlo's) as a new, innovative visually interactive communication / learning medium in the African context
- Implement agricultural capacity building, to be achieved through focused community-based training workshops
- Transfer of skills to further “localise” interactive3d learning objects (i3dlo's).

Note: an associated i3dlo is also available that addresses the repair of Gullies, in particular, the building of stone checks.

In addition, this i3dlo can also be linked to two other i3dlo's that show how to identify the contour lines and to mark these by pegging out the field – using either the A-FRAME or LINE-LEVEL approaches.

1.1 Rural skills - main outcomes

- How gullies can develop from small rills
- How gullies permanently impact on productive farming land
- The importance of preventing the development of gullies and

- A trigger for discussion around these issues and how they can be avoided (see Section 1.7 - Final Thoughts)

This i3dlo is aimed primarily at helping farmers to understand how to build stone checks as a way to stop gullies from further degenerating. It doesn't address other issues, such as the erosion process, or how gullies grow. Note that the vertical scale of the gully shown has been exaggerated for effect.

1.2 Applicable life skills (general)

A principal project goal is to develop competence-based learning material that will help to empower rural people and to stimulate their minds in a way so that they can fill in the detail using their own local knowledge.

Thus, the learning material should (1) Inspire; (2) Stretch; (3) Develop self-confidence; in such a way that we can (4) **Modernise, without necessarily Westernising.**

1.3 Target audience & application

The i3dlo simulations developed as part of this project are directed at functionally (semi) illiterate people in rural communities who are (or plan to) working in small-holding farming activities.

The i3dlo's are suited for use as *part* of skills development workshops where they are embedded and used with other training material – where they can for example be embedded into PowerPoint presentations (see Annexure 2).

They will typically be used by farm extensions services, local community centre training staff, or as in the case of this project, directly by organisations such as World Links Zimbabwe, who are “training the trainers” as well as farmers in local, rural communities.

1.4 Context

Soil and water conservation: Good soil and water is very important to farming successfully. Southern Africa is, however, technically classified as a semi-arid desert region – and is moving more and more towards a permanent drought situation. Capturing water in situ, either through soaking, or through water collection can play a major role. To compound the situation, bad agricultural practices, over many years, have led to dangerous levels of soil removal. It is estimated that between 13 and 25 tonnes of soil per Ha is being lost every year. Over time, this has obvious implications for food production and even human sustainability in the region. Soil has become the region's largest export, and soil conservation is a major priority for the SA Government. Minimising soil removal and retaining rain-water at the farm or district level is therefore crucially important.

Gully Control – Degeneration: This i3dlo shows the user how gullies are formed and how to stop them from spreading further and causing more destruction.

Gullies form over a long time, and tend to develop from rills. Once they are allowed to form, they tend to continue growing in size over time due to water-based erosion. Water transports loose particles of the soil away, first forming rills and then increasing the size of

the rills until they form gullies. Soil and rock continues to be transported into rivers, finally ending up in the sea.

Understanding how gullies form can help the farmer understand the damage they can cause, as well as the importance of taking steps to stop them forming. Once gullies are allowed to form, they are difficult to repair.

At best, measures can be taken to stop them growing further. If they are allowed to continue growing in size, they can cause huge damage and significantly impact on the amount of productive land available to the farmer – leaving the farm land unfit for farming. In turn, this impacts on the revenue generating potential of the farming unit.

Other relevant information resources include:

1. **Water and soil conservation with drought in mind**, Isaiah Nyagumbo and Francis T. Mugabe, Swedish Cooperative Centre Small Holder Drought Mitigation Programme, Harare, 1999
2. **A Guide for Farmers on Good Land Husbandry - Soil and Water Conservation.** Zimbabwe Farmers Union / Agritex (undated)

1.5 Navigation menu

The simulation starts by explaining the impact of gullies, by giving a quote from Mrs. Marozva, a farmer from Zishiri village (Zaka, Zimbabwe):

“A gully is like a disease, and the land is sick when there is a big gully. But the cure for the disease does not lie in the gully itself. When you work there, you only treat the symptoms, not the root-cause of the disease. The cure for a gully lies in the catchment, in our contours, on our fields, in the grazing areas, in the waterways and along our footpath”
Mrs. Marozva, a farmer from Zishiri village (Zaka, Zimbabwe)

This i3dlo serves as an introduction to the problems that gullies can cause. It serves as an introduction to a separate i3dlo that shows how to build a stone check (see Section 1,.1). Thus, there is one menu option:

- The degeneration process:

1.6 The degeneration process

The main message given is that gullies form over a long time. Water transports loose particles of the soil away, first forming rills and then increasing the size of the rills until they form gullies.

The soil, and rock is transported into rivers, finally ending up in the sea, leaving the farm land unfit for farming until the gully is repaired



1.7 Final thoughts

This i3dlo looks at how gullies form over time, and how they are the end result of poor land management over a long period of time at a regional level and not necessarily at the individual farm level.

Workshop delegates could therefore be encouraged to discuss a much more holistic approach to land and soil management.

Gullies usually start with the formation of rills in the field, and the most obvious intervention is to stop rills from forming into gullies! However, while it is easy to stop rills from growing by filling them in while they are small, it is much more important to remove the water flow that causes the rill to develop in the first place.

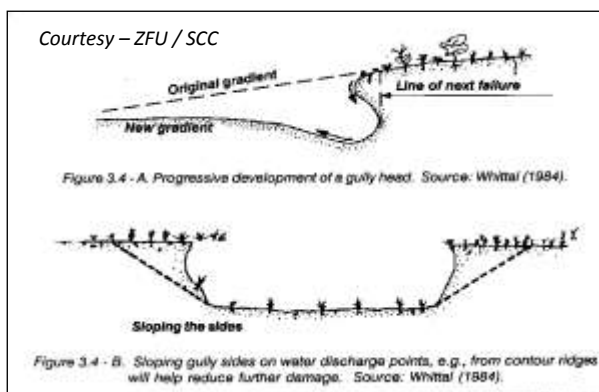
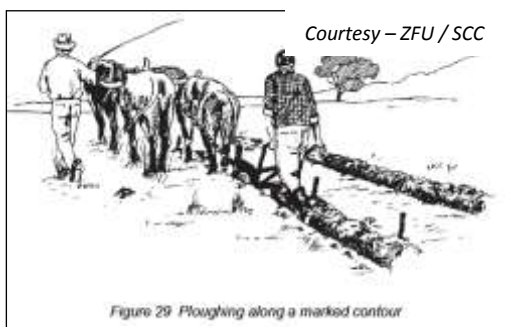
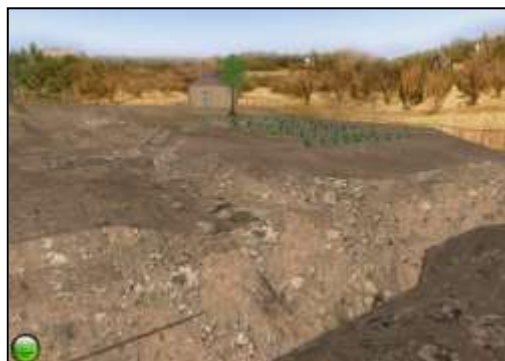
The i3dlo ends with a posed question that can be used to initiate discussion in the group on this important issue - and to raise awareness of managing water flow in the field before major (and permanent) damage occurs.

In many cases, the solution begins with ploughing the field *along* the contours. In this way, water cannot flow down the slope, as it is trapped within the furrows. Even better, this trapped water will soak into the soil and become a water source for the planting. In this way, water is harnessed as a farmer's friend, not the enemy.

Two separate i3dlo's developed in this series are aimed at showing how to identify the contour lines and to mark these by pegging out the field – using either the A-FRAME or LINE-LEVEL.

You could also stimulate discussion by asking how to prevent gullies from growing - by for example, cutting down overhang sides and gully-head as in the diagram opposite (courtesy of Agritex, ZFU), which shows how gully-heads grow over time, by creeping backwards (one can build gully-head stone checks to slow this process down).

Another part of the solution is demonstrated in another separate i3dlo that shows how to build stone checks cross the gully floor to prevent further erosion and gully growth.



2 Text to translate

In this section, we look at the text that has been included in the i3dlo, either on buttons, used in pop-up boxes etc.

There are two places where text is normally contained within an i3dlo.

1. Firstly, text appears in image files, i.e. either in .png or .jpeg files. These files are contained in the first table below. For each piece of included English text, a Photoshop PSD filename is provided (as a template) and the actual filename as well as the font used is given.
2. The second place where we place text is inside JScript files. **However JScript is not used in this i3dlo.**



For each text element described, a second language cell has also been included to help you to work on the new language text. *We suggest you copy this table into a separate file to work on.*

English text	New text	Filename	PSD Filename	Font
Gulley - formation and degeneration		Gulley_formS.jpg	splash_Screen_NR.psd	Arial , Bold, 12.7mm, RGB Colour Code: 0,0,0
Note: This is a screen that contains credits and licensing information. Because most of this information consists of names of individuals and their contact details you may not wish to translate the text. Should you prefer, however, to localise this information please see the Credits & License.psd file for details		Credits & License.jpg	Credits & License.psd	Arial, Colour Code: 0,0,0
Exit Menu		bExMenu.png	ButtonText.psd	Arial, Bold, 1.76mm, RGB Code:

				255,255,255
Hello		bHello.png	ButtonText.psd	As above
Controlling gullies		bControl.png	ButtonText.psd	As above
The degeneration process		But1	ButtonText.psd	As above
Process completed		hCompleat.png	Popup Heading Master.psd	1.76mm, RGB Code: 0,0,0
Controlling gullies		hControl.png	Popup Heading Master.psd	1.76mm, RGB Code: 0,0,0
The degeneration process		hDegen.png	Popup Heading Master.psd	1.76mm, RGB Code: 0,0,0
Gully Control Simulation		hGullyC.png	Popup Heading Master.psd	1.76mm, RGB Colour Code: 0,0,0
Welcome to the Gully Control Simulation		hWelcome.png	Popup Heading Master.psd	1.76mm, RGB Colour Code: 0,0,0
A gully is like a disease, and the land is sick when there is a big gully. But the cure for the disease does not lie in the gully itself. When you work there, you only treat the symptoms, not the root-cause of the disease. The cure for a gully lies in the catchment, in our contours, on our fields, in the grazing areas, in the waterways and along our footpaths		pSplash.png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Code: 255,255,255
Gullies form over a long time. Water transports loose particles of the soil away, first forming rills and then increasing the size of the rills until they form gullies. The sand is transported into rivers, finally ending up in the sea, leaving the farm land unfit for		pFormation.png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Code: 255,255,255

<p>farming until the gully is repaired.</p>				
<p>Gullies are a clear sign of some major management disorder.</p> <p>Work with your neighbours to understand the problem and to solve the problem together. We need to reduce the flow of water and to repair the gullies. How would you do it?</p> <p>Click here to continue...</p>		<p>pGullyC[1].png</p>	<p>Popup Text Master.psd</p>	<p>Arial, Bold, 1.76mm, RGB Code: 255,255,255</p>
<p>The degeneration process can continue for years but it can be stopped.</p> <p>How do you prevent it and where do you start?</p> <p>Discuss this in your group and share the ideas with your neighbours</p> <p>Click here to continue...</p>		<p>pDegen.png</p>	<p>Popup Text Master.psd</p>	<p>Arial, Bold, 1.76mm, RGB Code: 255,255,255</p>
<p>Welcome to the Gully Control Simulation!</p> <p>This i3dlo looks at ways to repair gullies and to stop them spreading further and causing more destruction – and subsequent loss of farmland.</p> <p>Click here to continue...</p>		<p>pWelcome.png</p>	<p>Popup Text Master.psd</p>	<p>Arial, Bold, 1.76mm, RGB Code: 255,255,255</p>

3 Audio to translate

3.1 Narration

The narrations act as an aid to the learning process and to reinforce specific messages.

3.2 Compression data

File type : Wave (Microsoft)
Audio Format : MPEG Layer-3
Audio Attributes : 24,000 Hz, 56kBit, Stereo

3.3 Audio file content



Filename	Text
<i>splashscreen.wav</i>	A gully is like a disease, and the land is sick when there is a big gully. But the cure for the disease does not lie in the gully itself. When you work there, you only treat the symptoms, not the root-cause of the disease. The cure for a gully lies in the catchment, in our contours, on our fields, in the grazing areas, in the waterways and along our footpaths.
<i>intro_1.wav</i>	Water is our friend, but if we don't manage water properly, it can also be our enemy and take away our soil – this is called erosion. If left too long, gullies can form in your fields.
<i>intro_2.wav</i>	In this section, we are going to look at some ways that gullies can be repaired.
<i>intro_3.wav</i>	If you have gullies on your farm, this is definitely for you.
<i>popuptext_1.wav</i>	Gullies are a clear sign of some major management disorder. Work with your neighbours to understand the problem and to solve the problem together. We need to reduce the flow of water and to repair the gullies. How would you do it?
<i>popuptext_2.wav</i>	Gullies form over a long time. Water transports loose particles of the soil away, first forming rills and then increasing the size of the rills until they form gullies. The sand is transported into rivers, finally ending up in the sea, leaving the farm land unfit for farming until the gully is repaired.

Annexure 1: How to localise i3dLO's - a summary

Arguably, the most powerful feature of *Interactive3d Learning Objects* is their translatability into many other languages. This feature means that the knowledge encapsulated within each I3dLO can cross language barriers and be shared with a global community at the click of a button. Audio and text components can easily be translated into other languages by exploiting the so-called "ZIP" compression functionality built into .EOZ files. This is how it's done.



The Basics:

All the information needed to run an i3dLO such as text files, audio files, etc, can be found inside the compressed .EOZ file. In principal, you need to replace the graphic and audio files in the EOZ in order to change the text and audio components of the I3dLO to a new language.

This is actually very easy to do if you follow these steps:

1. You've probably worked with compressed .ZIP files before. Well, an EOZ file is basically the same – you just need to unzip it! We recommend that you use WinRAR to do this as it is NOT case sensitive, unlike WinZIP which IS Case-sensitive (trust us on this one, you'll thank us later!). WinRAR is a shareware program that can be downloaded at <http://www.win-rar.com> so go get it if you haven't already.
2. Right, now you have got WinRAR at the ready, you're raring to go. Not so fast. First you need to do something very important. Save a backup copy to work on (we never work on original files!). Now open the file with WinRAR by right-clicking on the file, choose "Open With" and select WinRAR. You may have to click on "Choose Program ..." and then select WinRAR from the list or browse to its location to get it to open your file if it's not already associated with .EOZ files. Hey presto, the inner secrets of your I3dLO are revealed!

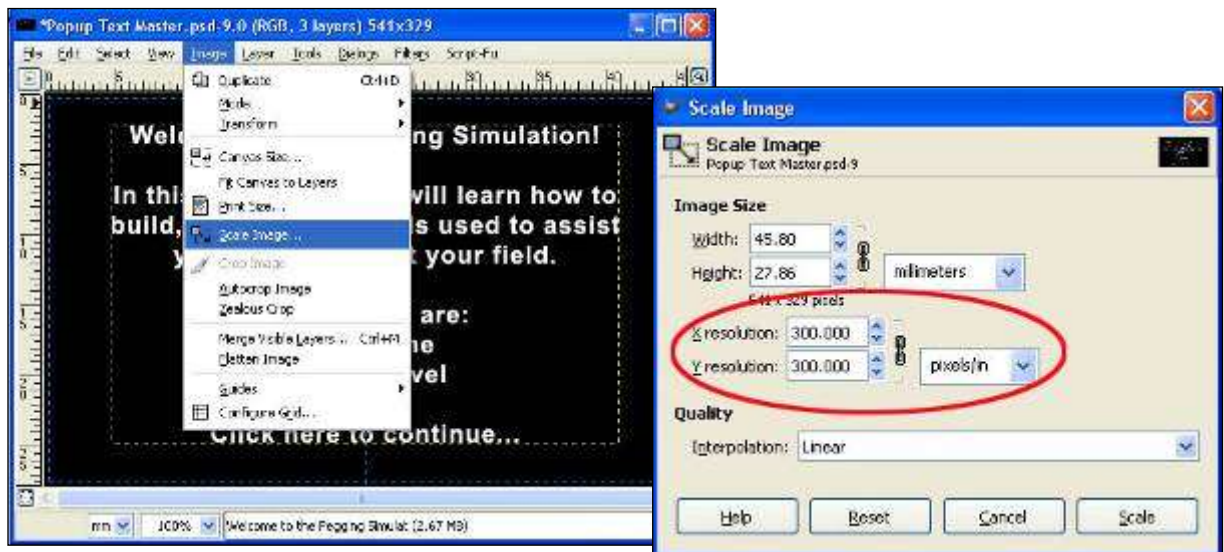
Replacing Text Textures:

OK. Now that you've opened the .ZIP file with WinRAR you're probably thinking, wow, there's a lot of stuff in here. You'll probably see about half a dozen types of files. Don't panic. We're only interested in a couple. We'll take it step by step - starting with text replacement.

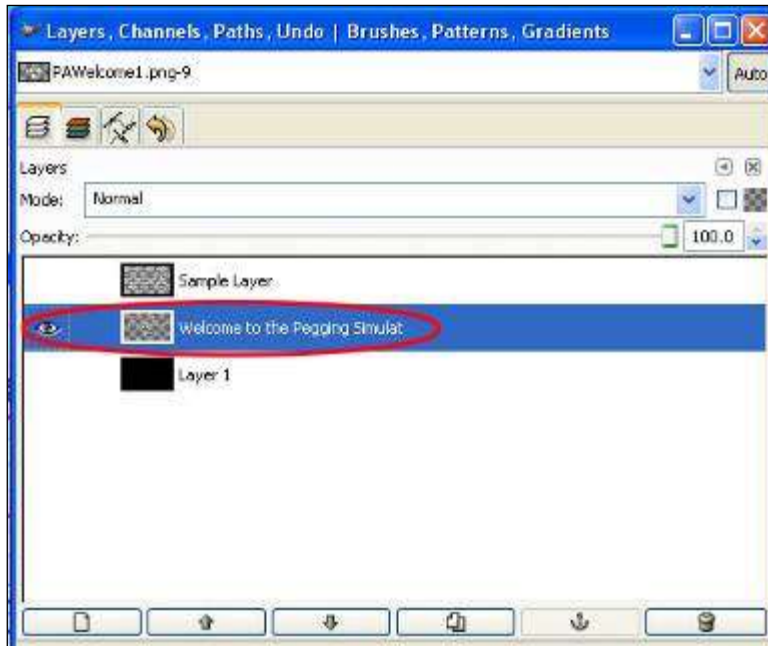
1. You'll see that there are a number of .PNG files inside the file. These contain the actual text that is used in the i3dLO. These are the files that you need to replace with your new, translated versions. But please don't edit the .PNG files directly. You can download a set of Adobe Photoshop™ .PSD files from the website (see the Photoshop resource folder) that can be used as templates to generate your own, translated content.
2. They are precisely sized to ensure that the text fits the way it should. These Photoshop "templates" are listed next to the relevant .PNG files in tables below together with the fonts, font sizes and font colours you'll be using.
3. Go ahead and open the .PSD file and type your own translated text in. If you have Photoshop then the process of editing the text layer contained within a .PSD file is a simple process. You can purchase a simpler and cheaper download version called "Photoshop Elements" from Adobe.com for approximately USD 100.
4. What? Do I hear screams and a gnashing of teeth: "How do I open .PSD files if I don't have Adobe Photoshop™?" Relax, take a deep breath and then download a secret weapon from the Web called "GIMP" from <http://www.gimp.org/>. With GIMP you can do photo retouching, image

composition, image authoring, open .PSD files and, what's more, it is open source and therefore, free!

5. OK, that was the good news. Now for some bad news. GIMP won't actually allow you to edit the .PSD file's text layer itself because it turns it into a raster image as opposed to editable vector-based text. This means that you can only use the text layer as a guide for the correct placement of your new text. The table below gives you all the font information that you need. However, before you start, you must make sure that GIMP is using the correct resolution otherwise you'll never get the font size right. The settings will obviously vary from project to project. For Pegging out with the A-Frame you must set GIMP's resolution to 300 pixels per inch. Click on "Image" then "Scale Image" to get to the right window. Make sure that the X and Y resolutions are set to 300! Check out the screen shots below.



6. **There is one important thing to keep in mind when you are editing the layers.** You only want your new text layer to be visible. Make sure, therefore, that only this layer is visible in your layers palette. Look for the "eye" icon next to the text layer. See the screenshot below.



7. When you're done, save the new file as a .PNG file. Now, this next bit is very important: You must save your new .PNG file using EXACTLY the same file name as the original file otherwise the .EOZ file won't recognise it and it simply won't load into the simulation – don't use the .PSD file name and don't say we didn't warn you!
8. When you're ready simply drag the new file from Windows Explorer into the open WinRAR window to replace the old file. That's that! Or is it? Nope, not quite but almost. Your .ZIP file will, to be frank, do just that. Zip, nada, nothing.

You have to rename the simulation file extension back to .EOZ again to be able to run your i3dLO in the EON Viewer. Now you're done.

Replacing Audio files:

1. Now you'll have noticed a several other files inside the .EOZ file that have a .WAV extension. At this point all the experts among you will, no doubt, stretch and yawn with a "been there, done that expression" on your faces. Just bear with me as we run through some more basics. All the I3dLO's that you download from the website contain WAV files recorded at 44kHz, in 16 bit and stereo, with MPEG layer 3 compression. This gives good quality audio with a low file size and is our audio standard for I3dLO's. For a more detailed discussion about audio files take a look at the August 2006 "News and Views" which contains a great article about recording audio clips.
2. By now you should be familiar with the procedure for "un-zipping" .EOZ files. If you're still not comfortable with this, have another look at the steps outlined above and try it out a few times. Practice makes perfect, after all.
3. Once you've finished recording your audio clip you have to save it back to the original file in WinRAR. We must stress again at this point how important this step is. Save your new .WAV file using EXACTLY the same file name as the original file otherwise the .EOZ file will not be able to pick it up when the simulation is run, *capiche?*

Annexure 2: Linking i3dlo's to PowerPoint

You can also use your simulations in PowerPoint presentations. It's easy to set up and all you have to do is the following:

1. Open PowerPoint, move to the slide where you want to inset the simulation
2. Click on *Insert / Object*.
3. Select *Create New* and *EonX 4.0.1* (note, the version number is likely to be higher) & click *OK*.



4. An empty selection dialogue box will now appear on your screen. Right-click on the selection. Click on *Properties* and complete the following fields:

Autoplay: 1

Simulation File: The **path** to your simulation file (NB: Check your file extensions – If you're using *EON Distribution Files* the file extension will be *.edz* & if you're using *EON Studio Documents* the extension will be *.eoz*).

5. When you now view your slide show, the EON simulation will automatically run when you move to the PowerPoint slide that you have linked to the simulation.



Annexure 3: General information

Simulation Viewer - installation

i3dlo's have been developed and are normally distributed as separate files (they will have either an .EOZ or .EDZ file extension). You will need to install the EON Viewer to run these simulations. If you haven't already installed the latest viewer, or don't have a latest copy, it can be found at www.naledi3d.com (select the "i3dlo home" button / downloads, the link is at the top of the page). The latest version (September 2008 is 6.0.0).

There is no installation process for i3dlo files. Once they have been copied to your hard drive, they can be run by simply double-clicking on the file name; or you could consider placing a short-cut on your Windows desktop, or for example, embed relevant i3dlo's into your PowerPoint presentations (see Annexure 2 for more on this).

Computer specifications

It is important to keep in mind that VR simulations require PC's with a "good" graphics card and sizeable memory. The terms "good" and "sizeable" can be defined along the lines of the following hardware configuration, which would be our PC of choice:

- Intel Pentium IV or AMD Athlon CPU (2GHz or better)
- 256 MB RAM (512 MB RAM preferred)
- At least 250 MB spare hard drive disk space for installation – some of the i3dlo's can be as big as 20Mb (or more) each
- Sound card and stereo speakers, CDRROM
- Monitor capable of 1024 x 768 or better
- AGP or PCI-E Graphics card with at least 128Mb of dedicated memory onboard (256Mb preferred) (Nvidia GeForce cards are recommended.)
- 3-button mouse and Windows XP

i3dlo simulations have been known to run on smaller computers, such as notebooks with the Intel graphics chipset (for example, with 128Mb shared memory); and World Links in Harare have even run some smaller simulations on older Pentium III computers. However, it is the nature of "real-time" interactive graphics programmes that the better the graphics card / chipset combination, the more dedicated graphics memory and PC memory available, the better the simulation will run.

Typical symptoms of using a computer that is "low" on specifications is that the simulation take longer to load; are "jerky" when moving around; or some of the textures may not render properly.

Mouse usage

Depending on which i3dlo is being used, a computer mouse can be used in varying ways to control movement around the simulation. Firstly, as in most software applications, the user uses the mouse to move the cursor and mouse clicks to make selections from displayed menu items, or to click to move the i3dlo forward when dialog boxes are displayed.

However, because the i3dlo is based on Virtual Reality (VR) and interactive 3D worlds, the mouse can also be used (sometimes this option is intentionally "turned off") to move around the 3D world.

This is usually achieved by holding the left –button in and sliding the mouse slowly forward to move forward, or left / right to turn (depending on which direction you want to go). This navigation control is quite intuitive and normally only take a few seconds of practice to get used to the idea, and to also get used to co-ordinating the speed of the mouse movement with the actual speed of movement within the simulation.

Similarly, the right mouse button can often be used to move vertically (up or down) in the simulation; and a combination of the left button and the keyboard key to change the angle of view (again these options may have been intentionally turned off).

The middle mouse button may also be used change the angle of view.

Finally, there may be some cases where the left / right buttons may have been intentionally

swapped. A little trial and error will help you to determine what mouse controls result in which movements in a particular i3dlo.



Troubleshooting

In this section, we look at some common problems that may arise when working with interactive simulations.

1. Simulations don't run smoothly

By their nature, VR allow you to move around the 3D simulation in real time. While this is one of the more powerful features of Virtual Reality, it also means that the quality of the “screen re-rendering” is dependent on the amount of memory (both dedicated graphics and computer memory) and the system CPU that is available. If the simulation is not running smoothly it is likely that your computer is below specification (for that particular i3dlo). In marginal cases, you could try to reduce the load on the PC by closing as many other applications as possible.

2. Audio

Rarely, the sound option may become disabled. To check click on *Tools* on the **EON Viewer Menu Bar** (right). Select *EON Configuration* from the drop-down menu and click on *Wave Sound*. The Wave Sound Properties menu will appear. Make sure that the *Sound Off* box is **unchecked!**

