W.K. KELLOGG FOUNDATION
Grant No. P3002256

NALEDI 3D FACTORY

Agricultural & Life Skills Project

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Module: Soil and water conservation
Pegging out contour lines using a Line Level

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Localisation documentation

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VR in Africa – for Africa – by Africa

WORLD LINKS

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Pegging out using the Line level i3dlo - LOCALISATION DOCUMENTATION

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- 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 interactive3d learning object is also available that addresses the identification of contour lines using the A-frame.

1.1 Rural skills - main outcomes

- Why a field should be pegged
- Things to think about before starting to peg
- How to make a Line Level

- Pegging out using the **Line Level**
- Understanding how to identify and peg out level contours, and to identify slopes of 1:250 (for Contour Ridges) and 1:100 (Tied Ridges).

This i3dlo is aimed primarily at helping farmers to understand the importance of ploughing along contours and how to achieve that aim; as well as surveying the field using a Line Level and by pegging (marking) out the field accordingly.

Note, there are other ways of surveying fields. A similar approach, using an A-frame is explained in a separate i3dlo in this series.

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.

Pegging out: This i3dlo shows one simple way to peg out a field using the Line level - and to accurately define the contours across the field.

Knowing how the contours run across your field is important when ploughing in order to minimise, or control water run-off. Ploughing along the contour (as opposed to down the slope) helps to ensure that as much water as possible remains in the field and soaks into the soil. If water runs down the slope, it will wash away topsoil and nutrients, to the detriment of the field environment as well as the farmers' ability to generate income.

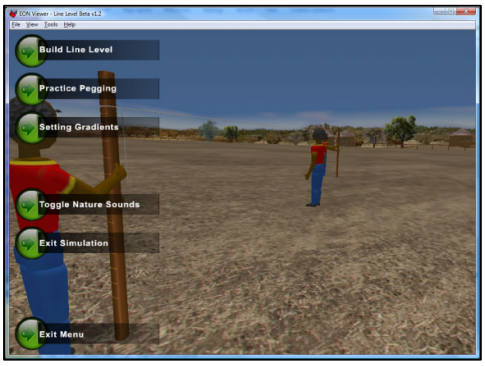
Other relevant information resources include:

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 Management** – Harare University / Agritex (undated)
3. **A Guide for Farmers on Good Land Husbandry - Soil and Water Conservatio**n, Harare University / Agritex (undated)
4. T**echnical Brief – the A Frame**. Practical Action Technology Challenging Poverty –(undated)
5. **Erosion Control and Soil Conservation,** Home Garden Technology Leaflet 7 – FAO Corporate Document Repository. (Undated) www.fao.org/docrep/003/x3996e31.htm
6. **Simple surveying techniques, use of the line level for surveying**. Water harvesting, Annexure 1). FAO Corporate Document Repository. (Undated). www.fao.org/docrep/U3160E/u3160e/0a.htm

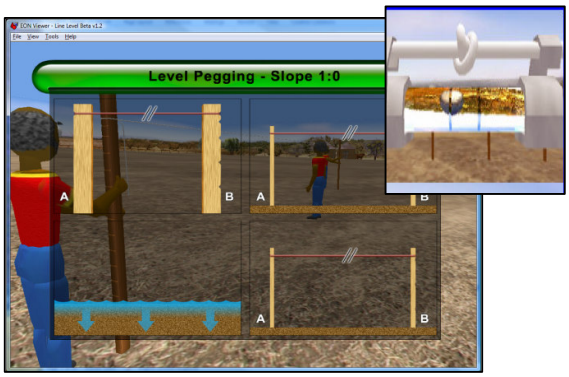
1.5 Navigation menu

After an introductory screen that places the i3dlo in context, a navigation menu will appear:

Building a Line level	Discussed below
Practice pegging	Discussed below
Setting Gradients	Discussed below
Toggle nature sounds	Turns the background sounds on /off
Exit simulation	Exit the simulation and return to Windows
Exit menu	Close the menu items



Building (making) a Line Level, practicing pegging out and setting gradients are discussed in more detail below.



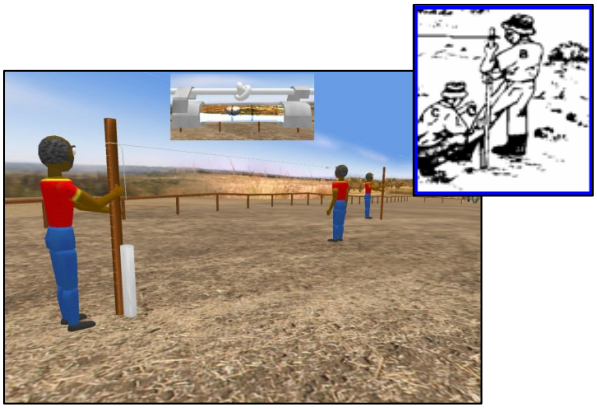
1.6 Building an Line Level (and how the Line Level works)

A line-level offers a simple way to lay out contours and gradients. It is simple to operate, is accurate and is easier to transport than the A-frame. The first step is to actually make a line level - addressed in this section of the i3dlo.

The i3dlo shows the user how to put a line level together, then goes onto look at how to notch the two poles in order that the Line Level can be used to survey level ground, as well as slopes of 1:100 and 1:250.

To conclude, it then also links to the section on establishing gradients, which explains the difference between level ground (0:1) and 1:100 and 1:250 gradients, or slopes (Section 1.7).

1.7 Practicing pegging out



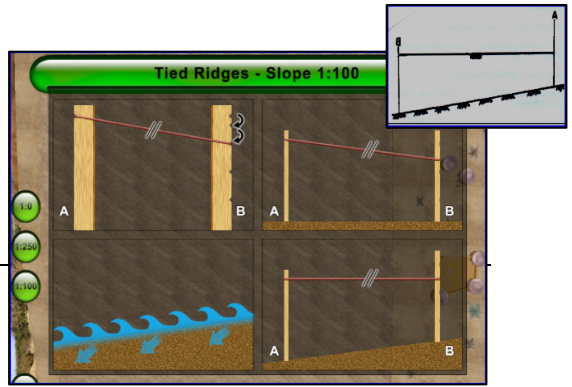
The second section of the i3dlo shows how to use the Line level to find two points of equal contour levels in the field. When the two poles are on same level points, the spirit level mounted on the string (which has to be pulled tight) will be centred. The new point is then PEGGED. Then, the two poles are moved forward (shown in the i3dlo) and the next level point found - and the process repeated across the field.

The end result is a line of pegs indicating a line of equal contour across the field. The process is then repeated 10 to 30 metres down-slope (depending on the field slope) to produce pegged lines indicating lines of equal height.

In this way, the farmer can plough along the contour line, knowing that as much water as possible will be retained in the field during future rainy seasons (N.B. it may also be practical to make the pegged lines more permanent by building ridges so that the work done in the pegging out process is not lost).

1.8 Setting Gradients

The Line Level does have one advantage over the A-frame in that it is very easy to also survey the field for other gradients other than dead level.



This is done by moving the string to differing notches on one of the poles, as explained in the simulation, which shows three important examples:

- Level pegging 1:1
- Contour ridges 1:250
- Tied ridges 1:100

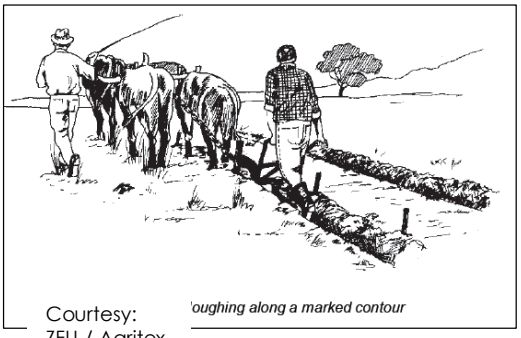
Level pegging: Desired gradient of pegged line = dead level (0:1) and the string is tied to the top grooves of each pole

Contour ridges: Desired gradient of pegged line = 1:250 and string is moved down on one pole to the 4cm groove

Tied ridges: Desired gradient of pegged line = 1:100 and string is moved down one pole to the 10cm groove

1.9 Final thoughts

Note that when pegging at a gradient, keep in mind that water will always flow in the direction of the pole with the string at the highest mark - because this pole would be set at a lower spot in the field when the string is horizontal.



Courtesy: ZFU / Agritex

oughing along a marked contour

Finally, By surveying the field using the line level (or A-frame), the farmer can be sure that they are ploughing along the contour line, knowing that as much water as possible will be retained in the field during future rainy seasons

It may also be practical to make the pegged lines more permanent by building ridges so that the work done in the pegging out process is not lost).

Finally, if ploughing is not done along the contours, there is every chance that the field will lose top-soil due to water-based erosion, especially in the rainy season.

This could take the form of sheet erosion if water is allowed to run across the field; or if rainwater becomes channelled, then rills will form. If these aren't taken care of in time, then the rills could grow into gullies, which are very difficult to control and almost impossible to repair.

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
Pegging out contour lines – using a Line Level		Line_LevelS.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
Auto-Complete Pegging		bAutoPeg.png	ButtonText.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255

Toggle Nature Sounds		bBirds.png	ButtonText.psd	As above
Build Line Level		bBuildLine.png	ButtonText.psd	As above
Exit Menu		bExMenu.png	ButtonText.psd	As above
Show Final Result		bFinalResult.png	ButtonText.psd	As above
Exit Simulation		bExitSim.png	ButtonText.psd	As above
Setting Gradients		bGradient.png	ButtonText.psd	As above
Practice Pegging		bPeg.png	ButtonText.psd	As above
Hello		bHello.png	ButtonText.psd	As above
Top View		bTop.png	ButtonText.psd	As above
View Level Plane		bViewLvl.png	ButtonText.psd	As above
Walk Mode		bWalk.png	ButtonText.psd	As above
Contour Ridges – Slope 1:250		hContour.png	Popup Heading Master.psd	As above
Information Message		hInfo.png	Popup Heading Master.psd	1.76mm, RGB Colour Code: 0,0,0
Level Pegging – Slope 1:0		hLevel.png	Popup Heading Master.psd	As above
Tied Ridges – Slope 1:100		hTied.png	Popup Heading Master.psd	1 As above
Welcome to the Pegging Simulation		hWelcome.png	Popup Heading Master.psd	As above
Edge of field reached. You have reached the edge of the field for this side of the contour line.		pEdgeField1[1].png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255

You now have to go back to the starting point and continue pegging in the opposite direction.				
Edge of field reached. You have reached the edge of the field for this contour line. You now have to go back to the starting point and measure the required distance down the slope. Once you have done this, you can continue pegging out the next contour line.		pEdgeField2.png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255
Note that when pegging at a gradient, keep in mind that the water will always flow in the direction of the pole with the string at the highest mark. The reason for this is because this pole has to be at a lower spot in the field for the string to be level.		pNote.png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255
You can now plant crops along the contour lines. • If you are not sure whether to peg dead level or at a gradient, speak to the extension worker. • Do not use a string that stretches when wet, as your survey will be inaccurate. • Makes sure that your poles do not stand on a ridge, a rock, an anthill or in a hole.		pReminder.png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255

• Make sure that your poles do not sink into the ground – attach a plate at the bottom. • Make sure that your line is stretched and your poles are vertical				
Welcome to the Line Level Pegging Simulation! In this simulation you will learn how to build and use the Line Level Pegging Tool. This tool is used to assist you in pegging out your field at level contours, or at pre selected gradients. Gradients can help you effectively irrigate your land		pWelcome[1].png	Popup Text Master.psd	Arial, Bold, 1.76mm, RGB Colour Code: 255,255,255

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
Lintro_1.wav	We need to make sure that as much soil stays in our fields as we can. Pegging out our fields shows us where our contours are. This means that we can: • Plough along the pegged level contour lines to make sure that rain-water and our soil stays in the field. • See where to build contour ridges so that excess water drains slowly without carrying away our soil.
LNeeds1.wav	A line-level offers a simple way to lay out contours and gradients. It is simple to operate, is accurate and is easier to transport than the A-frame The first step is to make a line level, which we will show you how here. First of all, you will need three people and a few items:
LNeeds1-1.wav	A small spirit level with hooks so that the level can be hooked in the middle of the line
LNeeds1-2.wav	Two straight poles with flat ends – about 8 cm thick and 1.6m long
LNeeds1-3.wav	11 metres of nylon string or yellow 'Builders Line'. – It's important that the string cannot stretch when it is wet, as this will influence the accuracy.

LNeeds1-4.wav	A ruler
LNeeds1-5.wav	A measuring tape that can measure at least ten metres if available
LNeeds1-6.wav	A marking knife
LNeeds1-7.wav	Stones or wooden pegs to mark the contour lines
LNeeds1-8.wav	Finally, don't forget the four people • One to read the spirit level • Two to hold the poles and • One person to hammer the pegs into the ground
LMake1.wav	The first thing we need to do is to make our line level. Make a groove at exactly the same height on each pole – at 1.5 metres
LMake2.wav	Make a second groove exactly 4cm below the first groove; and a third groove 10cm below the top groove – in other words, 6cm below your second groove
LMake3.wav	Make other grooves at exactly 10 cm intervals down the pole
LMake4.wav	Tie a knot in the middle of the string. To find the middle, simply fold the string in half so that the ends meet. Now pull the string tight, and make a knot at the folded end. That is the middle of the string.
LMake5.wav	Measure exactly ½ metre in from each end of the string. This is where you tie the string to the top groove of each pole. This means that the line is 10 metres long between the poles when it is pulled tight – you should check that the line between the poles is 10m long
LMake6.wav	Now your line level is ready for use
LMake6b.wav	Hang your spirit level at the centre of the line – at the knot you tied previously
LHowWorks1.wav	Before we start pegging out, let's have a look at how the line level works
LHowWorks2.wav	Click on each of the three buttons on the left side of the screen to see how the line level works in each of the three cases
LHowWorks3.wav	When the string is tied to the two top grooves, which are at the same height, we can peg at a dead level, which means that water will not flow in either direction. We should use this line to guide us when we plough along a level contour line. 1in 0 is the recommended gradient for level pegging. This means level contours.
LHowWorks4.wav	When the string on one pole is tied to the 4 cm (2^{nd}) groove on one pole, and the top groove on the other pole, then we can peg at

	a gradient of 1 in 250. This is the recommended gradient for standard contour ridges – and where water will flow gently in one direction. 1:250 is the recommended gradient for standard contour ridges.
LHowWorks5.wav	When the string on one pole is tied to the 10 cm (3rd) groove on one pole, then we can peg at a gradient of 1 in 100, which is used when making tied ridges. 1in 100 is the recommended gradient for tied ridges
LHowWorks8.wav	Note that when pegging at a gradient, keep in mind that water will always flow in the direction of the pole with the string at the highest mark, because this pole has to be at a lower spot in the field when the string is level.
Line_use_1.wav	Go to your starting point at the crest of the field and put a peg into the ground
Line_use_2.wav	Place pole A next to the peg
Line_use_3.wav	Move pole B in the direction that you want to peg and hang the spirit level under the knot in the middle of the line
Line_use_4.wav	Keep the string tight and the two poles vertical. Now move pole B up and down the slope until the line is level
Line_use_5.wav	You can see when the line is level when the bubble in the spirit level is in the centre
Line_use_6.wav	Put a second peg into the ground next to pole B
Line_use_7.wav	Now move pole A to the new peg and take pole B further along the pegging line. Don't allow A and B to switch positions while pegging out.
Line_use_8.wav	Like before, move Pole B up and down the slope until the line is level
Line_use_9.wav	Continue in the same way to the field edge
Line_use_10.wav	Once the edge of the field has been reached repeat the process in the other direction. Go back to your starting point. Put pole A next to the original peg and use pole B to search for the next pegging point. Remember that you will always search for the level point with Pole B, and never with Pole A
Line_use_11.wav	Congratulations, you have now pegged out one contour line across your field. Now move down the slope to mark out another contour line

Line final.wav	If you are not sure whether to peg dead level or at a gradient, speak to your extension worker Do not use string that stretches when wet, your survey will be inaccurate Make sure that your poles don't stand on a ridge, a rock or an anthill, or in a hole Make sure that your poles don't sink into the ground This can be avoided by attaching a small plate at the bottom Remember: make sure that your line is stretched and your poles vertical If in doubt, speak to your extension worker Now that you understand how to peg out a field, can you think of ways that the pegged out lines are used? In this example, the lines are being used to guide where you plough When we plough or plant crops along a level pegged line, when it rains, the rain water cannot flow downhill and will soak into your soil – which is just what you want

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 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!

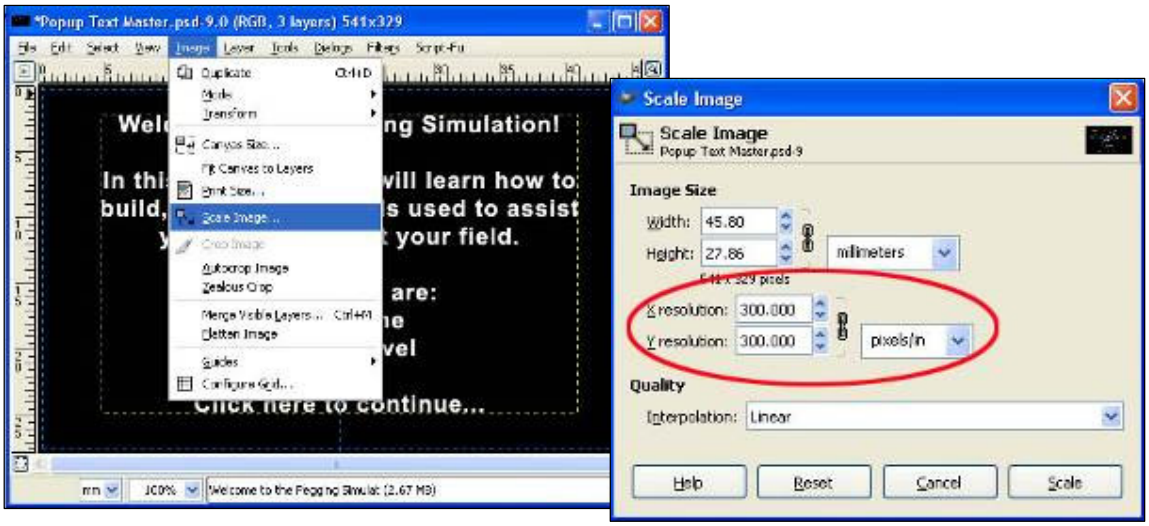
Replacing Text Textures:

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.

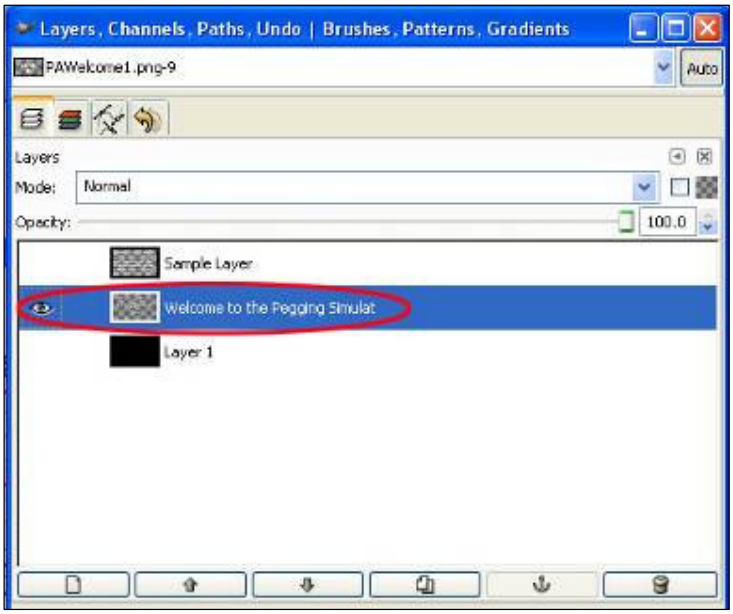
1. You'll see that there are a number of .PNG files inside the file. These contain the actual text that is used in the i3dLO. These are the files that you need to replace with your new, translated versions. But please don't edit the .PNG files directly. You can download a set of Adobe Photoshop™ .PSD files from the website (see the Photoshop resource folder) that can be used as templates to generate your own, translated content. 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.
2. 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.

3. 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!
4. 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.



5. **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.



6. 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!
7. 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:

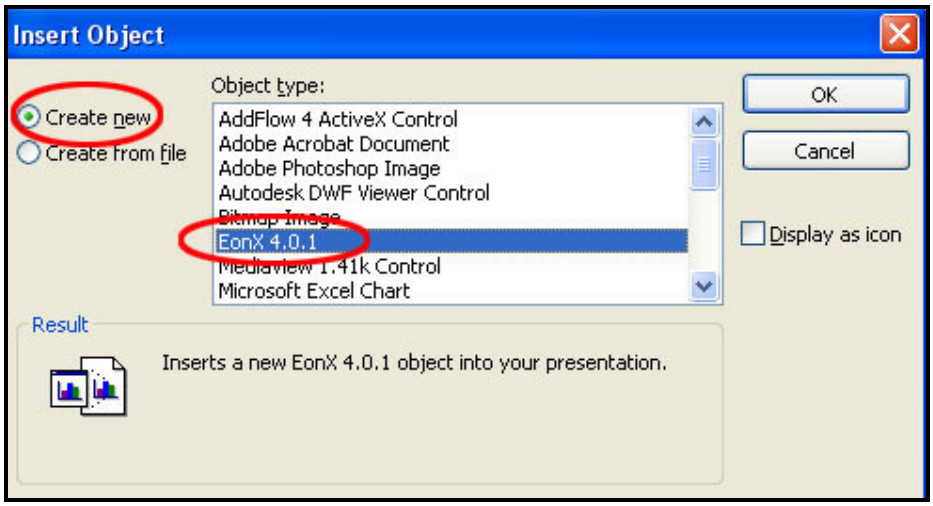
1. Now you'll have noticed a several other files inside the .EOZ file that have a .WAV extension. At this point all the experts among you will, no doubt, stretch and yawn with a "been there, done that expression" on your faces. Just bear with me as we run through some more basics. All the I3dLO's that 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:

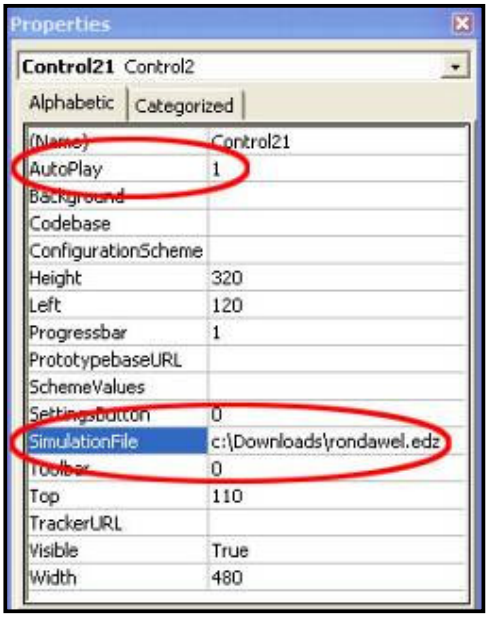
1. Open PowerPoint, move to the slide where you want to inset the simulation
2. Click on *Insert / Object*.
3. Select *Create New* and *EonX 4.0.1* (note, the version number is likely to be higher) & click *OK*.



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 "sizable" 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, CDROM
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

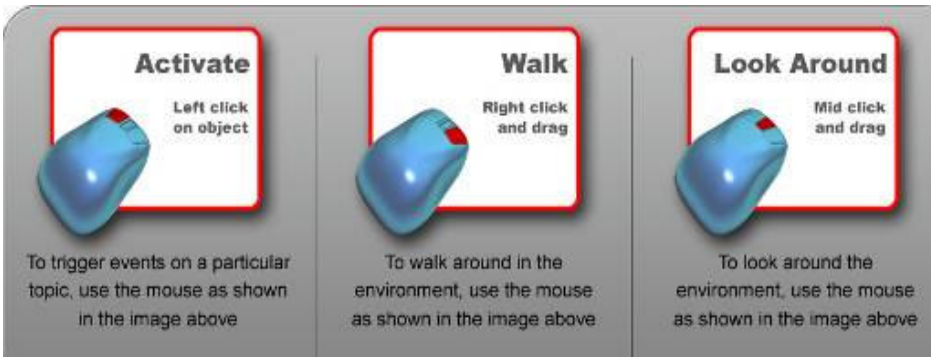
selections from displayed menu items, or to click to move the i3dlo forward when dialog boxes are displayed.

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 its nature, VR allows 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

On rare occasions, the sound option may become disabled. To check this 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 **<u>unchecked</u>**!