W.K. KELLOGG FOUNDATION
Grant No. P3002256

Agricultural & Life Skills Project

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Module:
Water harvesting from roof-tops

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Localisation documentation

September 2008

VR in Africa – for Africa – by Africa

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Contents

- 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).**
  Please note that some of the text translation is undertaken through editing JScript files. For more on this, see Section 2.
- 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 number 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 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.

Note: an associated interactive3d learning object is also available that addresses in-field water conservation.

1.1 Rural skills - main outcomes

- The main components of a rooftop water harvesting system

- Planning for water yield and the impact on storage size
- How to build a water storage tank (using the example of a 20 000 litre tank)
- An example of a more advanced storage system, water pumped to a roof-top storage system.

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 successfully farming. 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.

***Water harvesting from roof-tops*:** This i3dlo shows how to set up a system to harvest water from building roof-tops, which can provide a useful supplementary water source for schools, farms, homes and businesses.

Relevant information resources also include:

- **A Guide for *Farmers on Good Land Husbandry – Soil and Water Conservation*** – Zimbabwe Farmers Union / Agritex (undated)
- ***Water and soil conservation with drought in mind***, *Isaiah Nyagumbo and Francis T. Mugabe, Self-study guide, Swedish Cooperative Centre, Harare*
- ***An introduction to rainwater harvesting –*** *Global Development Research Centre (Tokyo Institute of Technology) (undated)* http://www.gdrc.org/uem/water/rainwater/index.html
- ***low cost gutter technique for use in rainwater harvesting***, *Peter Morgan (Zimbabwe),* http://aquamor.tripod.com/ http://aquamor.tripod.com/RAINWATER.htm *(1998)*
- ***Just How Much Rainwater Can You Collect Off Your Roof?*** http://www.thegoodhuman.com/2008/08/25/just-how-much-rainwater-can-you-collect-off-your-roof/ *2008*
- ***Rainwater harvesting from rooftop catchments,*** *Organisation of American States (OAS) (undated)* http://www.oas.org/dsd/publications/unit/oea59e/ch10.htm

1.5 Navigation menu

After the "splash screen" clears, an introduction to rain-water harvesting from roof-tops gives a background to this i3dlo, after which four menu items are given.

- The main components of a roof-top water harvesting system
- Building a water tank
- Water yield
- Build an advanced tank system

Selecting (clicking) each of the four buttons will trigger the respective sub-simulations (detailed below).

1.6 Main components of a roof-top water harvesting system

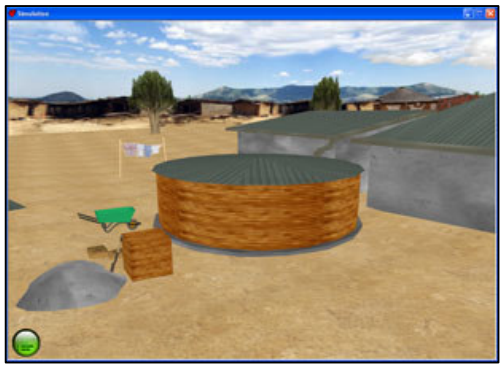
This section of the i3dlo shows the main components of a roof top water harvesting system, which generally consists of:

- A roof catchment system
- A guttering system to channel the water
- A storage tank into which the water is stored
- A roof for the tank to reduce contamination and evaporation losses.

The simulation shows these main elements as well as the most important building materials required to build the tank.

1.7 Building a water tank

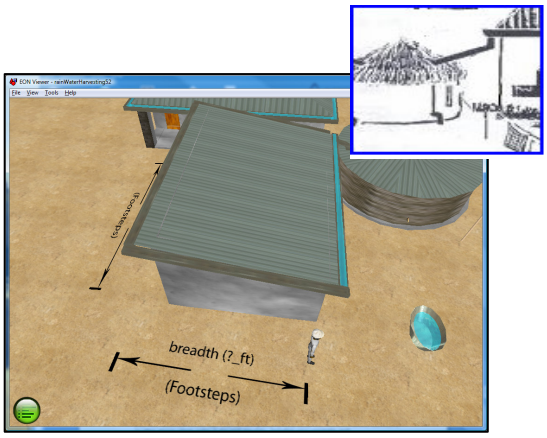
This section of the i3dlo shows how a traditional brick / concrete water tank can be constructed:



- House wall and roof (showing foundation hole (200mm deep)
- Round concrete base – 200 mm thick (top flush with ground level)
- 110mm brick circular wall (plastered on inside)
- Tap (outlet)
- Gutter and down pipes from roof (note - screened inlet in guttering)
- Gum poles to span brickwork
- Ferro-cement roof or tank cover.

While this demonstration shows how to construct a traditional brick / cement tank, it is likely that it may be easier and possibly even cheaper to install a factory manufactured plastic tank, which are becoming more and more readily available to farmers.

1.8 Water yield

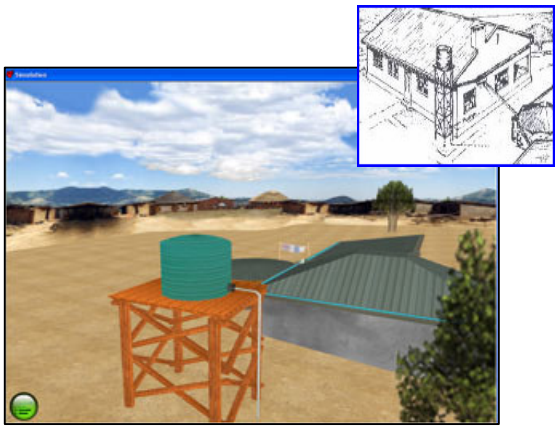


When a roof-top water harvesting system is installed, it is important to first calculate the amount of water that can be harvested, on average. This is done by calculating the area of the roof-top (length by breadth) and multiplying this by 80%. The 80% calculation adjustment represents a safety factor, based on experience that allows for roof slope, spillage, heavy rain etc. The resulting figure is multiplied by the average rainfall for the specific region where the tank is to be built.

Average rainfall figures can be obtained from the local farm extension workers. A rainfall statistics map is also included that shows Zimbabwe's mean annual rainfall across the country.

By calculating likely water yield first, one can be sure that the capital investment will achieve the desired results in providing water for the family use, irrigation, or both.

1.9 Building an advanced tank system



A more advanced roof-top water harvesting system would typically involve the construction of a raised storage tank, in which harvested water can be stored. This approach, while more capital intensive (and requiring a pump to move the water from the lower capture tank to the higher storage tank) does have two distinct advantages:

1. More harvested water can be stored (assuming local rainfall can support a larger storage capacity)
2. Because of the additional height, water can be gravity fed under higher pressure to the point of use, whether in the kitchen, in the house, toilets, bathrooms or other places where water is required regularly, including a vegetable plot.

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 contained.

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. For those of you who have never written a computer programme before here follows a serious i3dlo **Health Warning**. JScript is a computer scripting language. It tells the computer what to do – much like a recipe tells a chef how to prepare a specific dish. Now, just as the words in a recipe explain which ingredients to use and how to blend them all together, a JScript file contains detailed instructions telling the computer what to show on the screen, what sounds to make, etc. JScript uses a very specific **syntax** or way of writing out these instructions. This syntax is very, very sensitive. If you get it wrong, the i3dlo will, most likely, not run at all. Now that's a ruined dish you want to avoid!

   So, when editing a JScript file be **very careful** and change only what we tell you to in the second table below! First extract the JScript file using the methodology explained in Annexure 1 below. Open the JScript file in Notepad and proceed with caution by replacing the text as indicated and then save the file. Replace the old JScript file with the new one as you would any other file, by following the procedures explained in Annexure 1.

Advantages of JScript: We introduced the JScript approach for a number of reasons:

- **Word-length -** through experience and feedback, some languages require a greater number of words than the corresponding English text to convey the same meaning. This means that image templates are often not big enough to accommodate the translated text. JScript allows us to integrate a scrollbar in our text boxes which can therefore easily accommodate text and words of any length.
- **Image size -** images make for bigger files. JScript, on the other hand, is light and compact.

- **Efficiency -** finally, it's easier and faster to edit an entire i3dlo's text in one place (inside the JScript file) than to open numerous image files and painstakingly change each one.

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.*
Now go on and open the JScript file. One of the first things that you will notice is that each body of text is contained inside a function, e.g. *function Welcome (Language)* and that everything inside that function is enclosed in brackets: { }. These brackets are vitally important so **don't delete them!**

You'll also notice the word "case" all over the place. This is because we're using what's called a "switch" statement. In other words, you must have a separate "case" for each language that may be specified. For example, if we wanted to add a Zulu version of the text we would add the following to the bottom of the function (**within the brackets!!!**):

```
case "Zulu":

return "E tafuleni lika uFentse kune zinhlanzi ezintathu ezithukile ngoba ziqabanga ukuthi uTedesca
yisitabane. Izinwele zika Erik ziphela kanqane kanqane. Siwine umunqintiswano womhlaba weRugby.";

break;
```

That's all you have to do to get your translated text into the file. Only one more step to go. Our JScript file sets the language to English by default. You can change this very easily to specify another language. The third row from the top contains the following text:

```
var _Default_Language = "English";
```

This is a "variable" that specifies which language to pick. For example, if you wanted to ensure that our Zulu text appeared in the simulation you would have to change the variable to:

```
var _Default_Language = "Zulu";
```

That's it. You're done! Put your edited JScript file back into your .eoz file and you're ready to go!

A few final house-keeping rules:

- to force a line break, add the following: " ## ". Please note that there is a space before and after the double hash
- to force a open line, simply add " ## ## "

- **Images Table:**

English text	New text	filename	PSD filename	Font
Harvesting water from rooftops		RoofTopS.jpg	splash_Screen_NR.psd	Arial , Bold, 12.7mm, RGB 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
Main Components		But1[1].png	ButtonText.psd	Arial, Bold, 1.76mm, RGB Code: 255,255,255
Water Yield		But2.png	ButtonText.psd	As above
Building a Tank		But3.png	ButtonText.psd	As above
Advanced Tank System		But4.png	ButtonText.psd	As above
Clean Tank		But5[1].png	ButtonText.psd	As above
Calculate Annual Yield		But7.png	ButtonText.psd	As above
Rainfall Statistics		But8.png	ButtonText.psd	As above
Exit Menu		bExMenu.png	ButtonText.psd	As above

Hello		bHello.png	ButtonText.psd	As above
Click here to continue		Button_Text_Continue.png	ButtonText.psd	As above
Return to previous page		Button_Text_Return.png	ButtonText.psd	As above
Click here to see credits		Button_Text_Credits.png	ButtonText.psd	As above
Water Yield Calculations Formula		hYieldCalc[1].png	hMaster.psd	Arial, Bold, 1.76mm, RGB Colour Code: 0,0,0
Spot other water-capturing sources		hFindCaptureSources.png	hMaster.psd	As above
Length, Footsteps		New_Feet.png	feet.psd	Myriad Pro, Bold, 2.11 mm, RGB Code: 255,255,255
Welcome to the Rain Water Harvesting Simulation		hWelcome[1].png	Popup Heading Master .psd	Arial, Bold, 1.76mm, RGB Code: 0,0,0
Welcome to the rain water harvesting Simulation! Water can be collected in old oil-drums or buckets placed along walls, but it can be difficult to get enough large containers to catch and store the water when it does rain. In this simulation you will learn how to build a 20 000 litre brick tank.		pWelcome[2].png	pWelcome.psd	Arial, Bold, 1.76mm, RGB Code: 255,255,255

Click here to continue...				

JScript Table (TextPopupFile.js):

English text	New text	Function
"Large amounts of water can run to waste from the rooftops of our houses, as well as schools and farm sheds.## Water can be collected in old oil-drums or buckets placed along walls, but it can be difficult to get enough large containers to catch and store the water when it does rain.## Water harvested from roof-tops can provide a useful supplementary water source for the farm and it provides an essential reserve in times of emergency or breakdown of public water supply system particularly during natural disaster if it is stored in reservoirs.## Water harvested is owner operated and managed and it is safer than ground water and surface water. " ;		Welcome
"Scale: 1 Footstep = 0.5 Meter(s)## ## Average annual Rainfall = 500mm ## ## Water yield = 80% X roof_area ## X average yearly rainfall(mm) ## Example: ## Area of roof = (length X breadth) ## = (12 footsteps X 8 footsteps) = (6 meters X 4 meters) ## ## Area of roof = 24 (m2) ## ## Water yield = 0.8 X (24) X (500) ## = 9600 litres ## ## ## Thus a simple house of just ## 6(m) X 4(m), can capture approximately 9500 litres of rainfall water per year.";		BlankYield
"## Good. ## Now find the last capturing surfaces.";		FindNext
"## Good. ## Well done. You've spotted all water capturing surfaces. " ;		Congradulation
"## Now that you have seen how water can be collected. ## Find other water capturing surfaces. " ;		FindWaterSources

NB: Keep all symbols and punctuation marks in the same place and create a new case for each language you add!

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
intro.wav	Large amounts of water can run to waste from the rooftops of our houses, as well as schools and farm sheds. Water can be collected in old oil-drums or buckets placed along walls, but it can be difficult to get enough large containers to catch and store the water when it does rain. Water harvested from roof-tops can provide a useful supplementary water source for the farm and it provides an essential reserve in times of emergency or breakdown of the public water supply system particularly during natural disasters if it is stored in reservoirs. Water harvested is owner operated and managed and it is safer than ground water and surface water
intro_2.wav	You can also divert water falling from your roofs to your plants, but then your plants are getting more water when it is raining anyway; you aren't storing water for use on dry days."

components.wav	"A rooftop water harvesting system generally consists of a roof catchment, a guttering system to channel the water and a storage tank into which the water is stored" "To stop contamination and evaporation losses, it is important that the tank also has a roof.
water_yield.wav	"The first important step is to work out the size of the tank to be built. This is easy to do and it is based on 80% of your roof area, times the annual rainfall in your district". "If your roof area is 5m by 10m, then your roof area is 50 square metres."
components.wav	"The capacity of your tank will also depend on intended use and cost. For example, a family of 7 may use 20 litres a day – and a 20 000 litre talk will last almost 5 months" "You will be able to get your local annual rainfall figures from your local extension service or from the local Weather Service or Department of Meteorological services. Can you think where else you could find these figures?"
build_1.wav	"A reservoir is not too expensive to build using re-enforced brick and cement mortar. You could also buy a galvanised tank from a hardware shop. Either way, it is important to work out the cost of materials, not forgetting any builders that might help you"
build_2.wav	"The first step is to lay a 100 millimetre concrete base. Leave the concrete covered for two to three days to let the concrete set properly and so that it can take the weight of the walls" "Smooth out the surface of the concrete, which will help when you have to clean out the reservoir in the future"."
build_3.wav	"Once the base has cured, build the round wall up to a height of 1.6 metres using bricks. Don't forget to build in a threaded pipe abut three courses up, with a tap on the end" "Once the mortar has set, cover both the inside and outside of the walls with a cement-based

	plaster. This will ensure the tank is watertight and stop water from soaking into the bricks"
build_4.wav	"Secure a treated gum pole across the walls using metal strips. This is used to support the roof structure"
build_5.wav	"Place the roof structure onto the walls so that it is supported by the gum-pole and secure it to the walls. The roof can be made from ferro-cement or a pre-fabricated cover bought from a local supplier" Make sure your roof has a slight pitch. "The roof is important to stop water from evaporating and also as a safety measure to keep your children out!"
build_6.wav	"Put gutters around the house, making sure that they are set so that the water will always flow towards the reservoir, or else water will flow over the gutters and leak from low-points" "Standard guttering can be expensive, but you could, for example, use PVC pipes cut in half, or even bamboo!"
build_7.wav	"Connect the house guttering to the reservoir with a down pipe. Put a screen made from chicken wire at the top end of the down pipe to stop leaves and the like from getting into the tank"
build_8.wav	"Now that your reservoir is built, all you need is rain. When it starts to fill up, don't forget to check for leaks and enjoy the enjoy having your local free water supply…"
advanced.wav	"If your resources permit, you can also build a raised tank and use a pump to get water up from your new reservoir. In this way, you can use gravity to feed water into kitchens, toilets, bathrooms or other places where water is required regularly, including your vegetable plot"

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!

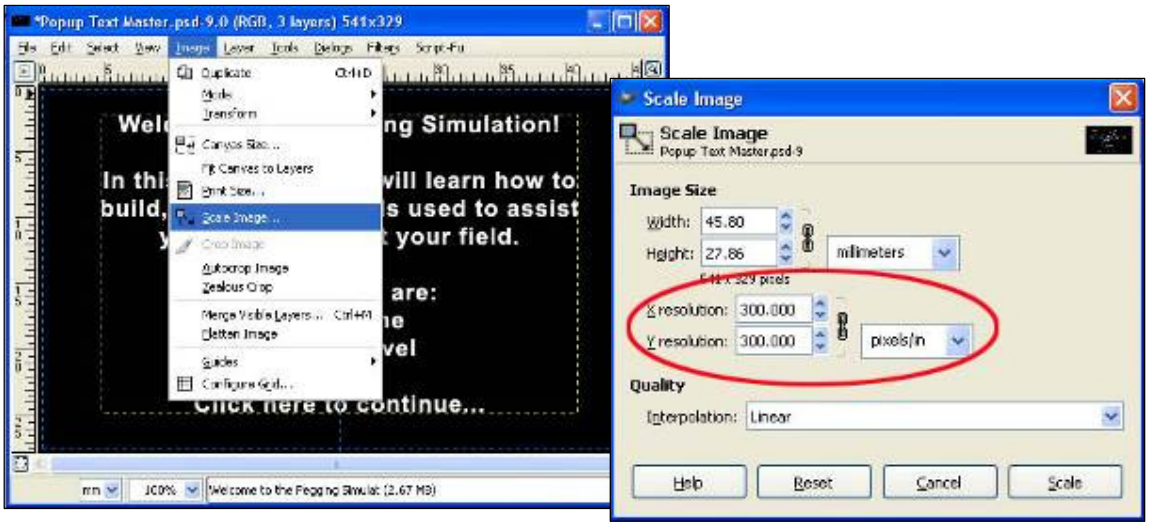
Replacing Text Textures:

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.

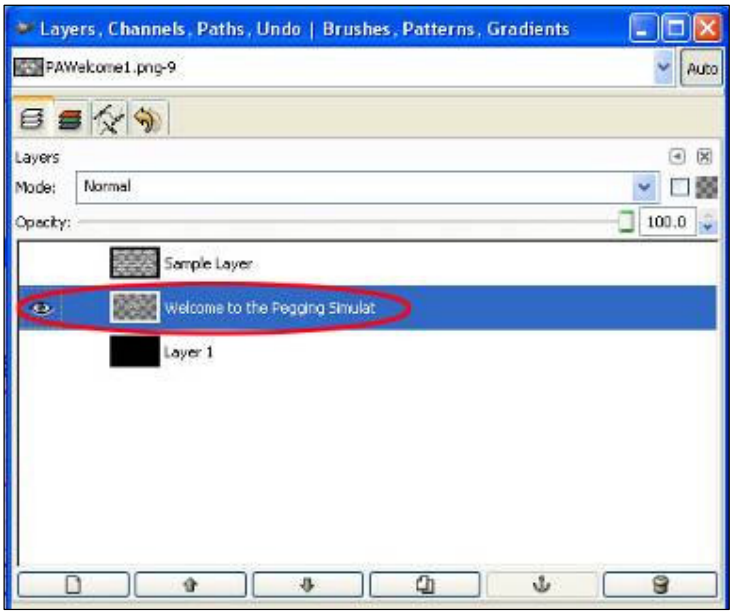
1. You'll see that there are a number of .PNG files inside the file. These contain the actual text that is used in the i3dLO. These are the files that you need to replace with your new, translated versions. But please don't edit the .PNG files directly. You can download a set of Adobe Photoshop™ .PSD 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:

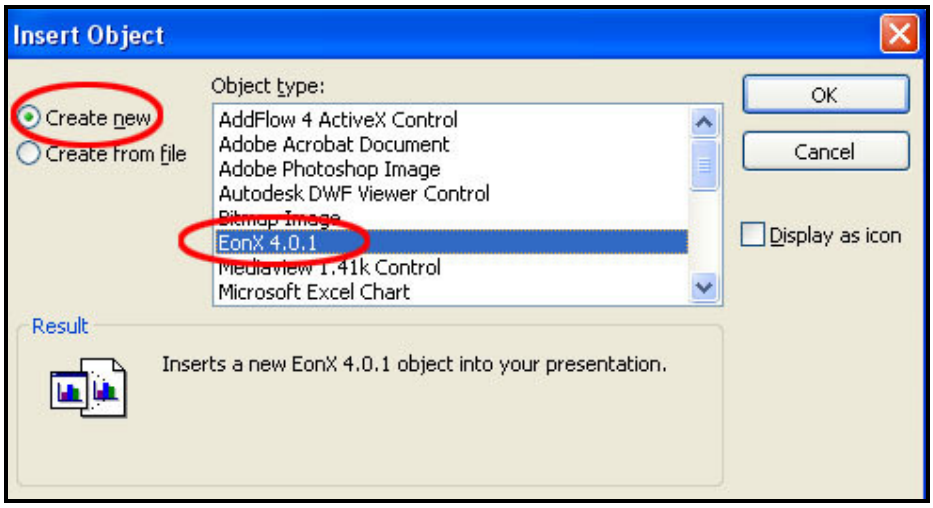
1. Now you'll have noticed a several other files inside the .EOZ file that have a .WAV extension. At this point all the experts among you will, no doubt, stretch and yawn with a "been there, done that expression" on your faces. Just bear with me as we run through some more basics. All the I3dLO's that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

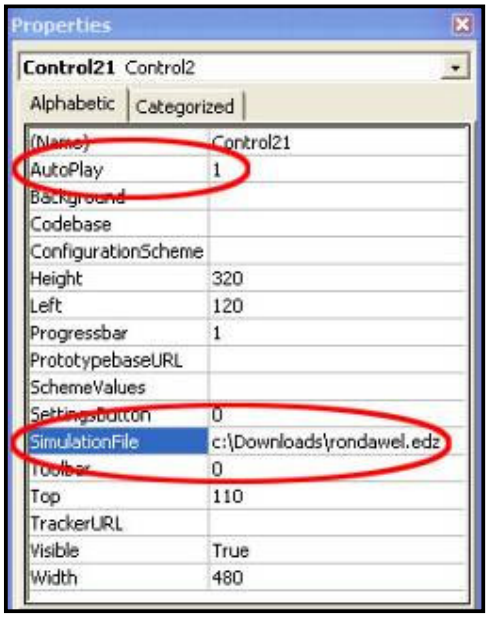
1. Open PowerPoint, move to the slide where you want to inset the simulation
2. Click on *Insert / Object*.
3. Select *Create New* and *EonX 4.0.1* (note, the version number is likely to be higher) & click *OK*.



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

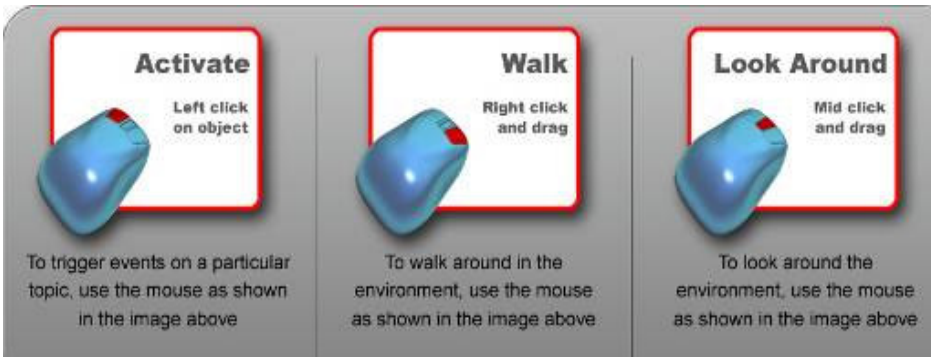
selections from displayed menu items, or to click to move the i3dlo forward when dialog boxes are displayed.

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 **unchecked**!