

**003bfed8-0**

**COLLABORATORS**

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WRITTEN BY		February 12, 2023	

**REVISION HISTORY**

NUMBER	DATE	DESCRIPTION	NAME

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# Chapter 1

## 003bfed8-0

### 1.1 PHENOMENA docs

PHENOMENA v1.0

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Legal~Matters

Registration info.

Introduction

Who/What/Why?

Requirements

Installation/Requirements

Quickstart

For those who hate reading docs :)

Docs

Detailed instructions & info.

Render~Tips

On using this with rendering programs

Credits

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Thanks to...

About~the~Author  
Who am I?

## 1.2 Introduction

### INTRODUCTION

-----

Phenomena is a program which creates random pictures of natural phenomena (hence the name). Currently (in the first version) electricity and firey explosions are supported.

I saw a magazine cover a few weeks ago, and it had a great picture on the front of it, created by one Jarrod Pudsey (sp?). The picture was created in LightWave®, and depicted a swirling vortex with lightning in it. It was so pretty, that I immediately set out to copy it :)

Unfortunately, I didn't have any pictures of lightning, and I wasn't about to draw animation frames in DPaint. I had just begun to learn the E programming language, and I thought to myself that it would be a good experiment to write a program which drew pictures of lightning.

I sat down, messing around with different methods, but I wasn't getting anywhere. So the next day, I went and asked a mathematics professor at uni about it. Unfortunately, he had no idea, but he was quite interested. So we sat for half an hour, and discussed various possible methods, until he finally came up with a seed which was to be the building block of Phenomena's lightning engine. I went home, and within an hour, I was getting about 5 lightning's per second on a hires screen. Past that, not much modification was made, other than adding forks to the lightning.

As for the explosion, that was much harder. I visited the office of another professor at uni, who specialised in this type of thing, but he knew nothing about simulating explosions which could help me. He did, however, know alot about lightning - turns out that the algorithm that we had made up on the spot actually simulated (pretty closely) the "dielectric breakdown of air in the surrounding region" or something...:)

I was pretty disappointed, but determined to find a way. I emailed many people both at uni and outside (going as far as the Australian Defence Force Academy, which were doing research on fire propagation) but got no replies. Eventually, I started experimenting at home. I began with a system which was based on Conway's Game of Life. That was progressing quite well, but my algorithms were quite slow, and I was getting frustrated waiting for frames to update in order to see the effects.

I put explosions aside for a while, and started trying to create a realistic rising-smoke effect. After several hours in total, I managed to create quite a good one. And then it hit me that this same method could be used for fast explosions. And it can be - as you can see.

The smoke effect was not included in this release, since it used colours which were very close to black in order to create a good effect. This limited their use in rendering programs (unless you were rendering onto a black background). Later versions of Phenomena will probably include smoke, using alpha channels.

That's the basic story - just thought I'd mention it :)

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Back to business...

## 1.3 Quickstart

### QUICKSTART

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The only reason I included this bit was because I know it's the first thing I would look at if I were you :)

Okay - the program is quite simple, but I'll take you through it, in about 20 seconds.

- a) Load it.
- b) [optional] Choose one of the "---> Prefs" icons; either the lightning or explosion one, and mess with the settings which show up.
- c) Click on either "Lightning" or "Explosion", to render them.

Now some requestors come up:

PAL or NTSC - Changes the vertical height  
The screen size to which you want to render  
- need I say more?

An ASL requester for the filename you'd like.

- this is a base filename, so enter something like "Phenomena.",

since

a number with leading zero's will be added automatically.

- d) Watch, wait, hang...whatever :)

## 1.4 FullDocs

### USAGE -----

Since this is my first programming effort, and when I started I knew nothing about the Amiga OS, I left the GUI pretty bare to save me time and pain. However, this makes the program stupidly easy to use, so everybody benefits in one way or another.

The window is arranged like this:

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Click on the top 4 to find out what they do.

About will pop up a window with credits, etc.  
Quit will leave the program.

## 1.5 Render

RENDERING

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When you click on either "Lightning" or "Explosion", a series of requesters will pop up to finalise some settings:

The first requester will ask you to choose a video mode (PAL or NTSC). This decides the size of the image which will be rendered.

PAL = 256/512,  
NTSC = 200/400 (vertical).

The second requester will let you choose between two different render-screen sizes, either:

low-resolution: 320 x 200/256, or  
 high-resolution 640 x 400/512.

The vertical height will be determined based on your selection in the first requester.

The third requester will prompt you for a filename which is to be the BASE filename for the frames. Here, use the ASL requester to select a directory and a filename.

The filename should be a new one, and should end with a ".". To this name, the program will append "0001", "0002"... "000n" depending on how many frames you select.

(Note: it is not necessary to add a fullstop to the file, it just makes it easier to read)

Once these have been chosen, the program will open a screen and begin to render. If you have the unregistered version, files will not be saved.

## 1.6 Elec

ELECTRICITY SETTINGS -----

Electricity~Type

Starting~Position

Bolt Colour - Self explanatory

Amount~of~forking

Random~seed

Number of frames - Obvious

Save~black~frames

Ok - Keep changes and close window

Cancel - Cancel all changes

## 1.7 Exp

EXPLOSION SETTINGS -----

Vertical~squeeze



Explosion~Violence  
Random seed - As for electricity.

(NOTE: I did not include an option for the number of frames that an explosion uses. Meanwhile, it is set to a small number of frames which should look good when played back in real time. If requests are made, I will change this).

## 1.8 elec\_saveblack

\* Save black Frames: In both the Bolt and the Storm effects, if this is activated, then after every frame, a random number of black frames will be saved in order to create the impression of a random pause between bolts. The random number is limited to 25 frames, or one (PAL) second.

## 1.9 elec\_type

\* Electricity Type: The program supports 3 types of electricity: Spark, Bolt, and Storm.  
Spark will create a bolt of lightning which stays in one general area, and "dances" on the spot. This is most useful for creating weapons on ships/robots :)  
Bolt will save a different bolt of lightning on each frame (including forked lightning). This is good for representing a mild electrical storm.  
Storm is much like Bolt, but it will save one or more bolts per frame. This is good for creating severe storms, or for wrapping around objects for psychedelic effects.

## 1.10 elec\_forking

\* Amount of Forking: The higher this slider is set, the higher the chance that a fork will branch from a rod of electricity. The default value of 15 creates quite pleasing results. I have limited the slider's value to 25, as values above this can lead to a huge amount of recursion (the function calls itself) and really ugly results :)

## 1.11 elec\_pos

- \* Starting Position: This decides whether the stroke of lightning will have its origin at the (top) centre of the window, or be randomly placed along the top of the window.  
When used in conjunction with the Spark effect, this will create a spark which dances either at the point where it ends, or at both start and end points. When you have a spark between two plates of metal, both ends should be moving; but if you're using it as a "weapon" effect, it'll look better if only one end is moving.

## 1.12 elec\_rnd

- \* Random Seed: This sets the global random seed. Basically, if you use the same number you'll get the same effect every time. I haven't actually tried this, but in theory it is so.

## 1.13 exp\_squeeze

- \* Vertical Squeeze: The higher this value, the more the explosion's aspect ratio will be changed, to make it wider than it is high. I included this because many of the good looking explosions you see on television start off thin, and blow up sideways more than they do vertically.  
The default is a round explosion, which (not counting random factors) is as wide as it is high.

## 1.14 exp\_violence

- \* Explosion Violence: The higher this value, the more "violent" the explosion will be. A high violence means that it will expand faster, and fill more of the screen. The current value of 8 is such that the explosion fills about 1/2 of the window in each dimension. Experiment with this.

## 1.15 tips

USING PHENOMENA WITH A RENDERING PROGRAM:

Phenomena will save pictures with a black background, so that they can be used with all popular (and even unpopular) rendering programs. All you have to

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do is set your program to use a SEQUENCE as a brushmap, instead of a single image, and make sure that the 0 colour (black) is selected as transparent.

Clip mapping is the best way to achieve this. I can't be of help here in many programs - actually, just Real3D:

In the materials window, create a material called "Explosion". for the brushmap, enter the filename you chose (without the extension which was appended by Phenomena) with full path, and append the string "%04d" to it. This tells Real3D to search for that filename, with an extension of 4 0's. Furthermore, turn on CLIP mapping, TRANSPARENT colour (make sure it is 0,0,0). Lastly, in the INDEX handler at the bottom, let a=1 and b equal the number of frames you have, so that Real searches for xxx.0001 rather than xxx.0000 to begin with.

I know that Lightwave uses clip mapping, and that Imagine should have a way of doing this, but I'm not as familiar with those programs as I am with Real, so I rather not give advice which will confuse.

## 1.16 author

### ABOUT THE AUTHOR

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I'm a 1st year computer science student at the University of New South Wales in Sydney, Australia.

Originally, I wanted to be a 3D animator, now I'm leaning more towards being a programmer of 3D effects/programs. I'll probably end up in consulting, anyway - so it doesn't matter :)

If you want to contact me, to offer suggestions (or for any other reason), mail me at

s2156114@cse.unsw.edu.au

If for some reason there's a problem with the uni server (it's happened once), and your mail gets rejected, then try this address, which is checked less often:

avi@triode.apana.org.au

Alternatively, snail-mail:

Avi Pilosof,  
106 Onslow St,  
Rose Bay, Sydney,  
NSW, Australia,  
2029.

Have fun with Phenomena!

Avi Pilosof.

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## 1.17 credits

### CREDITS

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The person I want to thank most is Colin Bell, the sysop of a local BBS called Twister. If it were not for him, I would never have even heard of E, not would I have learned how to program (other than the stuff they teach us in 1st yeat uni) for a while...Colin, thanks for the advice and for all the help.

I also want to thank the "gang" at Twister BBS, who had some good suggestions to make.

Of course - the beta testers; Tom Ellard, Nik Vukovljak, and Andy Jones.

Last, and most definitely least, I'd like to thank Wayne Lockhart - local goon, holder of the record for getting banned from BBS's - Whose suggestions for me to quit programming and go mess with Dpaint (said in a less gentle away) inspired me to finish Phenomena ;)

## 1.18 reg

### REGISTRATION

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Phenomena is shareware. This means that you can distribute the complete non-registered archive to anyone you want, as long as it IS the complete archive.

I claim all copyrights (and any other rights I may not know of) to this program.

In the unregistered shareware version, the program will not save iff pics of the scenes you render, it will simply render them to the screen and continue.

This is what I propose: :)

In order to register the program, you send me US\$20 in an agreed upon way (see later), and I will send you back a full version of Phenomena, fully personalised (well, it'll have your name in it somewhere) :)

I know sending money in any way is a bastard - I'm having the same trouble myself with another piece of s/w - but here's what I can come up with:

- a) Cash. This is illegal here in Australia, so I wouldn't recommend it. The reason being that if it gets eaten on the way here, neither of us knows what's going on... ie; Don't send cash, coz I'm not responsible.
- b) Transferring to my bank account directly. I don't know how it is in your country, but around here the thieves won't let you send less than AUS\$100, and it costs you \$20! (compare that to a phone call overseas, which would take longer...).

Anyway, the account number is:

2236-1002 5545

At the Commonwealth Bank of Australia, the Rose Bay Branch, in Sydney. The branch number is the first 4-digit number of the account number (2236).

When you use this system, you can leave a small message with the transfer. I don't know how small it is, however. Leave your name and address, and tell them to inform me that the money has been deposited. If, however, the message space is too small (I have no idea), then you'll have to just leave your name (MUST!) and send me your address otherwise.

- c) Bank draft. I just spoke to the bank about this. It costs me \$5 to cash this - but don't worry, I'll take it from the \$20. Realise that it'll probably cost you to send this - here it costs \$8 (AUST) - about US\$6.
- d) Postal money order - Seems to be a good method. Just go to your post office and do what needs to be done :)

I think that the best method for both of us is the postal order, followed by either the bank draft, or direct xfer - depending on how much it costs you.

Note that I can send the program to you in one of two ways: Firstly, by normal post.

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+-----+
| NOTE!: If you want me to send it to you via normal post, |
| then send $25 instead of $20. This goes towards postage |
| and a disk.                                           |
+-----+
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Secondly, I can send you the uuencoded archive by e-mail, if you have an internet account. This is MUCH handier, since it saves both of us alot of time (you'll get it within a day or two, most likely). It also saves you \$5.

Make sure you tell me which method you would like, and don't forget the extra \$5 for postage & disk.

Alternatively, if you have any other methods, email me (or even snail-mail if you so dare) and we'll discuss it. My e-mailbox gets answered very often.

Internet address: s2156114@cse.unsw.edu.au  
or: avi@triode.apana.org.au

<more info in "About the Author">

## 1.19 requ

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## INSTALLATION/REQUIREMENTS

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As for requirements, you must be running WB2 or higher, since Gadtools.library is needed, ASL is needed.

Furthermore, this program uses the time-saving IFF.library (which I'll include with the archive if I'm allowed to).

Lastly, you need ReqTools.library.

Once the required libraries are in your libs: directory, just drag the icon to wherever you want, and double click it.

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