

# 3D Environment

Jeff Setterholm

Version 0.64 July 17<sup>th</sup>, 2018

Web Link: <http://ftp.setterholm.com/3DEnvC/3DEnv.pdf>

Save as: 3DEnv064.pdf

© 2018 by Jeffrey M. Setterholm

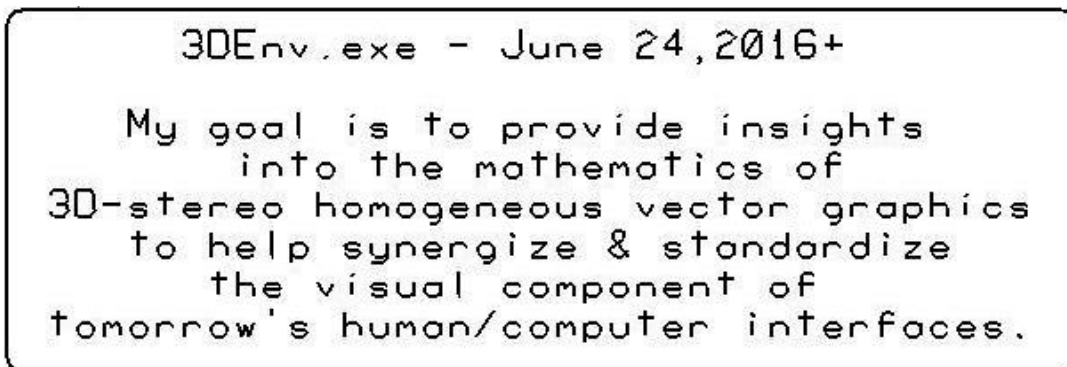
This document may be reproduced, in its entirety,  
without permission.

*Individual cognition is always flawed -&- Lawyers abound, so...*

**Use this environment at your own risk.**



**The PhilosophyWorks®**  
Lakeville, Minnesota, U.S.A.



In support of the goal, you'll find in this environment:

- A.** A 3-D visualization application (=.**exe**) which runs on computers with **Windows – NT, -XP, -7, or -10** operating systems; v0.64 is current
- B.** The full C-language source code for the application - which is freely distributable and freely extensible; v0.64 is current
- C.** Numerous screen shot 'selfies' of the application in use - 4k UHD is supported;
- D.** File "App-F1-OrthoProjection.c" is an example-&-template for adding your own content to 3DEnv.exe – giving you immediate access to all of the visualization options of the environment; assign your own intellectual property notification(s) to your "App(s)"; -&-
- E.** An explicit summary of the visualization transforms - which I have placed in the **public domain**. v0.61 is current

Want dynamic space-stabilized stereo visualizations?

**Welcome to the party!**

## Downloading:

This entire environment is on my website in a single ZIP file. You'll need to download the zip file to your computer and **“extract” the contents**. (Try right-clicking on the downloaded .zip-file & select the option to extract.) Page four ~ lists the zip file contents.

Typically the extracted files are in a new subdirectory; go to that subdirectory & **change “3DEnv.exf” to “3DEnv.exe”** which Windows will refer to as an ‘application’.

The link to the .zip file is:

<http://ftp.setterholm.com/3DEnvC/3DEnv.zip>

Equivalently:

[www.setterholm.com](http://www.setterholm.com) in the /3DEnvC subdirectory you'll find 3DEnv.zip.

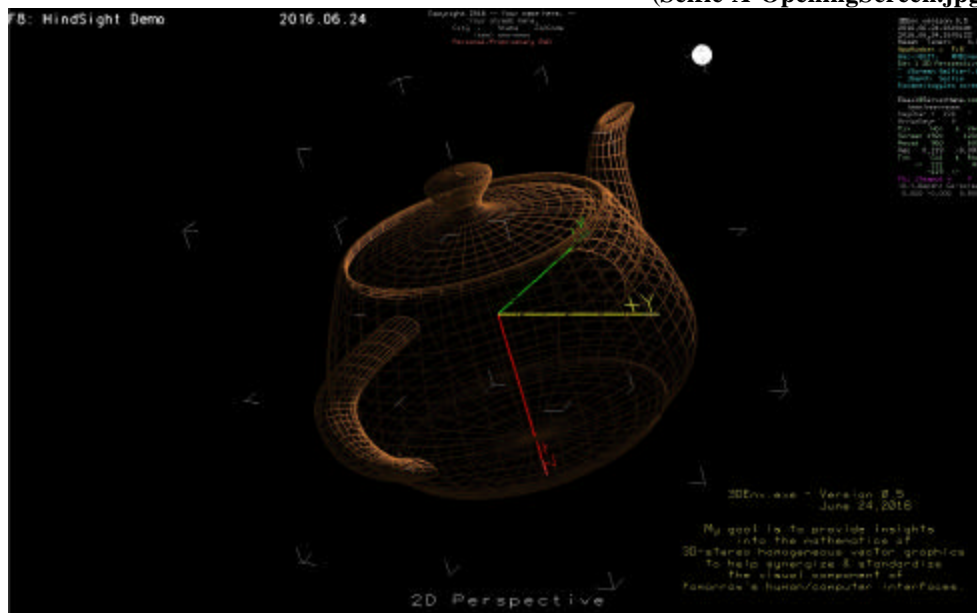
## From a CD:

I have also distributed the entire environment to some people on a CD. On the CD “3DEnv.exe” is already there as an “application”. You can either run the application from the CD or download the entire contents to a subdirectory on your computer. (Running from the CD – you won't be able to snap selfie's of the screen or export numerical data to .txt files.)

By either .zip download or CD... you're ready to go.

**Double click on ‘3DEnv.exe’.** **When a teapot appears on the screen... you've arrived.** The opening screen looks like this:

(Selfie-A-OpeningScreen.jpg)



Hold down the left mouse button & move the mouse... the teapot rotates.

Press the 't' key eight times to see the teapot as a wireframe or solid model with & without co-located coordinate axes. Pressing '~' snaps "Selfie0.bmp" & beeps.

Press the 'E' key six times to see 2D-Perspective, 3D-Red/Cyan, & 3D-Right/Left (i.e. crossed-eye), 3D-Left/Right (e.g. for head-mounted stereo viewers), and 2D-RawGL. For people who don't have 3D stereo perception – the 'n'/'N' key nutates the display - aiding depth perception via continuous motion. The 'c'/'C' key changes screen color.

Several applications are there. Press the function keys F1-F8 to access them. Apps can be viewed in your 'e'/'E' mode of choice.

Pressing 'm'/'M' toggles the screen menu from anywhere.

The screen menu:

(Selfie-I-MenuView.jpg)

```

F8: HindSight Demo          2016.07.10

Holding down the Left-Mouse-Button & moving the mouse rotates ModelSpace.
The 'n' or 'M' Key has Toggled this Text 'on'.
Use this if/when the Right-Mouse-Button won't bring up the menu,
as a reminder that keyboard keys will access the menu functions
as follows:

Main menu:
: Depth Selfies
~: Selfies->.bmp
cC: Screen Color
p: Print to .txt File
P: -DOS screen
vV: Viewing Info Toggle
bB: Breaker-Viewer
qQ: Quit

Apps Access:
F1: Ortho Projection
F2: Mandelbrot Set
F3:
F4: VecText7D Demo
F5: 3dv-Viewer
F6: Invert44-Demo
F7:
F8: HindSight Demo

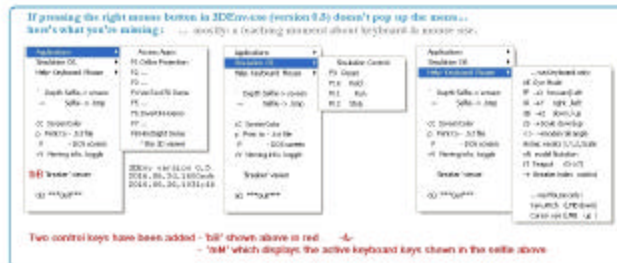
Simulation Ctrl:
F9: Reset
F10: Hold
F11: Run
F12: Stop
...runs the clock.

ESC: Full/Partial screen Toggle (press while in this window)

Via Keyboard only:      7doF Model Control:      Left Mouse Button
Screen effects:        Translation & Scale      Rotation
eE: Eye Mode           FF: +X: aFt/Forward      Yaw & Pitch: LMB-Down
nN: model Nutation    nR: +Y: lft/Right      Cursor control: -Up
=*: 'Breaker' index ctl. dD: +Z: up/Down      =>: Roll
TT: Teapot            eS: Scale decrease/increase
'Home' resets model Translation, Scale, & Roll

3DEnv.exe V0.6 2016.07.10

```



Type 'q'/'Q' to quit.

Use. Enjoy. Learn. Apply. Create.

www.setterholm.com /3DEnvC/3DEnv-Directory.txt <-- Current version=0.62  
2018.07.17 Jeff Setterholm  
8095 230th St. E.  
Lakeville, MN 55044

Download:  
07/17/2018 07: \_\_ PM 12, \_\_, \_\_ 3DEnv-v064-20170717.zip

Un-Zipping (i.e. extracting) yields:

07/28/2016 08:11 AM 4,040 3DEnv-v062-Directory.txt = This file  
07/17/2018 ~07:09p 298,237 3DEnv.pdf <- Introduction  
07/12/2016 03:26 PM 45,307 3DEnv-VisualizationTransforms.pdf

Screen Image 'Selfies' by 3DEnv.exe:

06/24/2016 04:07 PM 709,800 Selfie-A-OpeningScreen.jpg  
07/10/2016 01:21 PM 499,696 Selfie-B-SolidTeapot.jpg  
06/24/2016 04:18 PM 1,189,557 Selfie-C-WireTeapot.jpg  
06/24/2016 04:07 PM 877,457 Selfie-D-ProjectionNumerics.jpg  
07/10/2016 01:21 PM 670,972 Selfie-E-Derivation.jpg  
07/06/2016 05:11 PM 471,281 Selfie-F-Frustums.jpg  
07/10/2016 01:21 PM 647,512 Selfie-G-WhyBother.jpg  
06/24/2016 04:31 PM 908,448 Selfie-H-DepthSelfie.jpg  
07/10/2016 01:21 PM 795,622 Selfie-I-MenuView.jpg  
07/10/2016 01:21 PM 988,672 Selfie-J-3DV-Viewer.jpg  
07/10/2016 01:21 PM 448,830 Selfie-K-Font.jpg  
07/06/2016 05:18 PM 411,473 Selfie-L-Lincoln.jpg  
07/10/2016 01:21 PM 2,987,990 Selfie-M-Mandelbrot.jpg  
07/03/2018 11:59 AM 175,580 Selfie-o-FileHeaderDetails.jpg  
07/17/2018 05:15 PM 874,403 Selfie-P-FreeSymbol.jpg

The Executable Program:

07/10/2016 01:00 PM 518,832 3DEnv.exf <-- change '.exf' to '.exe'  
to run the program

Added 2016.06.26 - See 'GLUT notes' below.  
11/08/2001 02:27 AM 237,568 glut32.dll <-- Needed to run 3DEnv.exe

07/17/2018 06:38 PM 50,434 3DEnv.txt <-- ASCII output file  
except when running from a CD.

The Build file for the program:

07/10/2016 01:01 PM 8,704 3DEnv.gui

'C' Source Code (about 3800 lines total):

07/10/2016 12:42 PM 22,760 3DEnv.h <- 3DEnv's key variables: S.'s  
& the function prototypes.  
07/10/2016 11:00 AM 24,802 3DVecText.h <- vector font data  
used by function VecText7D  
07/17/2018 05:09 PM 137,031 3DEnv.c <- The beef: ~2600 lines of 'C'  
^ This includes App-F8 "HindSight Demo"  
^ Add your "App-F\_" in the last function.  
07/10/2016 11:10 AM 6,111 App-F1-OrthoProjection.c <- App template.  
07/10/2016 11:03 AM 12,300 App-F2-MandelbrotSet.c  
07/17/2018 05:25 PM 23,710 App-F4-VecText7D-Demo.c  
07/17/2018 02:45 PM 29,686 CharVecs.txt <-- A font entry method  
07/17/2018 04:54 PM 8,752 App-F5-3dv-Viewer.c  
06/28/2016 11:05 PM 25 App-F5-3dvFileName.ini <- initialization  
06/28/2016 10:45 PM 755,894 ^= LensVolumeMapping.3dv  
07/17/2018 04:57 PM 4,148 App-F6-Demo-Invert44.c

Added 2016.06.26 - See 'GLUT notes' below.

01/08/2002 06:36 AM 119,897 glut-3.7.6-bin.zip

Colors of the Color Indices:

06/24/2016 03:56 PM 1,792 3DEnvColorIndices.txt

~33 File(s) ~14,383,396 bytes

Use this software at your own risk.

'GLUT Notes' 2016.06.26 :

The version of GLUT that I use to build & run 3DEnv.exe is:

01/08/2002 06:36 AM 119,897 glut-3.7.6-bin.zip  
... which extracts to:  
02/10/1999 12:46 PM 2,290 glut.def  
12/13/2000 12:22 AM 27,670 glut.h  
11/08/2001 02:27 AM 237,568 glut32.dll <-- Needed to run 3DEnv.exe  
11/08/2001 02:27 AM 28,728 glut32.lib ^ 'Not found' message,  
11/08/2001 02:42 AM 26,454 README-win32.txt & extracted above.  
6 File(s) 322,741 bytes