

EMP Project

Working Links →

<https://goo.gl/7aJqj4>
<https://goo.gl/KYr6fd>
<https://goo.gl/caE8vq>

Based on Thesis AD 777841 on EMP by Terry C. Chapman. If following along with the detailed Fortran code see - <https://goo.gl/7aJqj4> for source docs with 90% accurate simulation.

A working web based version to play with is available at: <https://emp.lkdev.com>.

This projects creates a wrapper around a fortran program using apache and php.

A parameters file, based on 'params-template.txt' is generated and passed into 'EMPNPLT_FG2-corrected.x' (the program compiled with Fortran 77), then the output is returned to the browser.

Example of compilation of '.f' file to an executable file (.f is the source file, and .x is the executable):

```
f77 EMPNPLT_FG2-corrected.f -o EMPNPLT_FG2-corrected.x
```

This project relies on the contributions of many different people.

Notes




- The origin of the coordinate system is always at ground zero, directly below the burst. X, Y, and Z are read in using units of meters. If the reflected wave is to be calculated the altitude is read in as a negative number, (X, Y, -Z). The height of the burst is read in using units of kilometers.
- The magnetic field strength at the point of detonation, the following link has a calculator, <https://www.ngdc.noaa.gov/geomag/magfield.shtml>
- A discussion of webers/square meter for output data ; The output will give a value of nanotesla (nT) which can be converted to Weber per square metre (Wb/m²) here: <http://www.unit-conversion.info/magnetic-field.html> and this link to calculate magnetic inclination: <http://www.magnetic-declination.com/>
- The application stack is: Ubuntu (OS)->Apache (webserver)->PHP (server side scripting language, dynamic content)->Fortran77 (via system shell).
- Live version here: <https://emp.lkdev.com>

Downloads

- Ubuntu self-contained execution/development env for VirtualBox: [ubuntu-emp-20170930-1336.zip](#)
- Zip file of source code: [emp_sourcecode-20170930-1408.zip](#)
- - /fortran/ - contains original program source 'EMPNPLT_FG2-corrected.f', compiled version 'EMPNPLT_FG2-corrected.x', and 'params-template.txt' (a text file that the program parameters are fed into before the program is called)
 - /www-emp/ - contains web wrapper that takes parameters, populates them into a file, and pipes those values into 'EMPNPLT_FG2-corrected.x'

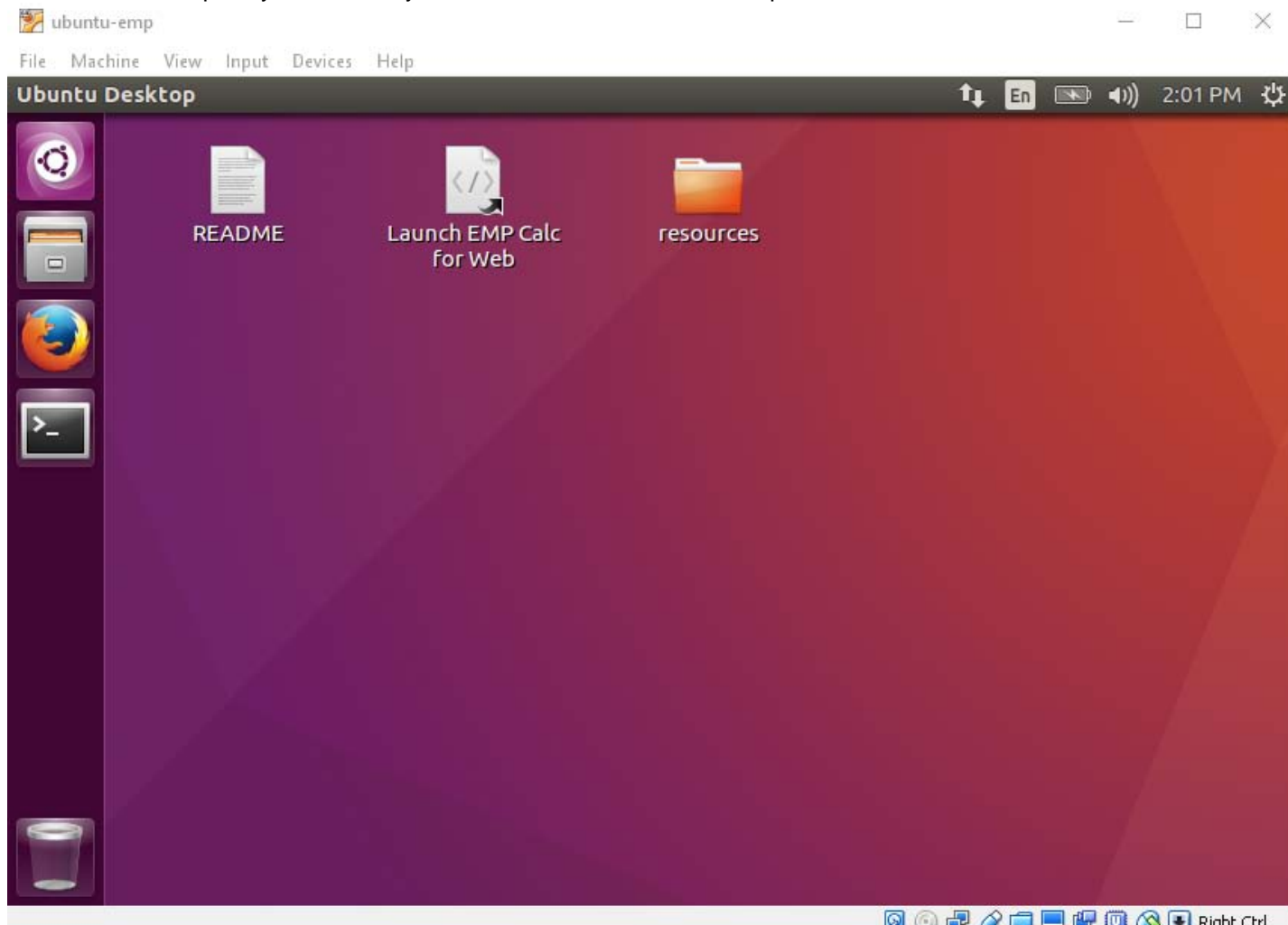
Instructions For Running Locally

1. Download VirtualBox for your operating system: <https://www.virtualbox.org/wiki/Downloads>
2. Run the setup to complete the install of virtual box
3. Download the latest "ubuntu-emp" .zip file from above. This contains the entire virtual machine.
4. Unzip the "ubuntu-emp.zip" file to your local machine, in an empty directory
5. The next step may be as simple as Doubleclicking the "ubuntu-emp.vbox" file to load the virtual machine into VirtualBox and begin execution:

 ubuntu-emp.vbox	9/30/2017 1:49 PM	VirtualBox Machin...	9 KB
 ubuntu-emp.vbox-prev	9/30/2017 1:34 PM	VBOX-PREV File	9 KB
 ubuntu-emp.vdi	9/27/2017 1:43 PM	Virtual Disk Image	5,553,152 KB

It is also possible that Virtualbox may want you to set some configuration settings. Most of these should not matter, but feel free to modify the number of processors and the amount of memory you'd like to allocate if you have more to spare.

6. The VM should hopefully launch and you should see the Ubuntu desktop:



- The "Launch EMP Calc for Web" shortcut should take you into the web-based version of the EMP calculator running locally.
- If you'd like to edit/view the sourcecode within the VM, you can do so under resources/emp_local/