1. Code retrieval

Download the latest Lagranto version from SVN repository <https://svn.iac.ethz.ch/websvn/pub/wsvn/>.

Then create a directory where you want Lagranto to be installed; place the whole source code in this directory and set an environment variable {LAGRANTO} pointing to this directory.

```
> setenv LAGRANTO {PATH TO YOUR LAGRANTO INSTALLATION}
```

2. Compiling the Lagranto code

Choose the correct Fortran compiler in <install.csh>. At the moment, PGI is set. I have sucessfully compiled the code with <ifort> and <gfortran>, so you might want to use one of these two compilers.
You additonally have to set in <install.csh> the environment variable <NETCDF> which point to the installstion of the netCDF libraries.

```
> setenv NETCDF  {PATH TO YOUR NETCDF LIBRARY}
```

```
> cd ${LAGRANTO}/
> ./install.csh clean
> ./install.csh lib
> ./install.csh create_startf
> ./install.csh caltra
> ./install.csh trace
> ./install.csh select
> ./install.csh density
> ./install.csh lidar
> ./install.csh goodies
> ./install.csh docu
> ./install.csh links
```

Add the end of the installation, it's best to add the following directory to your PATH variable. In <bash> this should look like

```
>  export PATH=${LAGRANTO}/bin/:$PATH
```

If the <LAGRANTO/bin> directory is in your PATH, then you will be able to run Lagranto from any directory.
Otherwise, you will always to give the full path to your Lagranto commands, e.g.

```
> ${LAGRANTO}/bin/caltra
```

3. Compiling the Grib-netCDF converter

In the subdirectory <convert/fgrb2cdf> you find the program you find the Fortran program which we use to convert the Grib files from ECMWF into netCDF. Note that we use a somewhat 'strange' netCDF format; therefore you have to use this converter. In the near future, I will make available a conversion tool based on the CDO tools...

You will have to set some paths to compile the program; in particular, a reference must be made to the GRIB_API.

4. Lagranto documentation

Lagranto comes with a detailed documentation; you can start it with one of the following calls:

```
> lagrantohelp
> lagrantohelp tutorial
> lagrantohelp reference
```

The most important program for you will be <caltra> which calculates the trajectories...

```
> lagrantohelp caltra
```

5. Test data set

On our FTP server you find a sample data set which allows you to run Lagranto without bothering about the Grib-netCDF conversion.

ftp://iacftp.ethz.ch/pub_read/sprenger/lagranto.ecmwf.test/

6. Minimal test run

a) Define a starting position in a file <startf>; the format is <longitude latitude pressure>.

```
> more startf
  8.0 46.0 500.
-10.0 30.0 850.
```

Each line corresponds to a single starting position. Note that longitudes must be within -180 ... +180 deg.

b) Start the trajectory

It is a forward trajectory starting at 00 UTC 1 Jan 2012. The time span is 18 UTC. Starting positions are taken from <startf>, the output is written to <trajectory>. For details about the optional flag <-j> and <-notimecheck>, please consult the Lagranto help <lagrantohelp caltra>.

```
> caltra 20120101_00 20120101_18 startf trajectory -j
> more trajectory
Reference date 20120101_0000 / Time range    1080 min

  time      lon     lat     p
-----------------------------

   .00     8.00   46.00   500
  6.00    10.02   44.07   480
 12.00    11.64   42.13   504
 18.00    12.66   40.17   514

   .00   -10.00   30.00   850
  6.00   -10.42   30.14   866
 12.00   -10.40   30.25   885
 18.00   -10.46   29.93   906

================================.
```