

Instructions for GNSS_VShell Program

Luigi Ciruolo (Gg), ICTP

*African School on Space Science: Related Applications and Awareness
for Sustainable Development of the Region*

Kigali, July 9th 2014

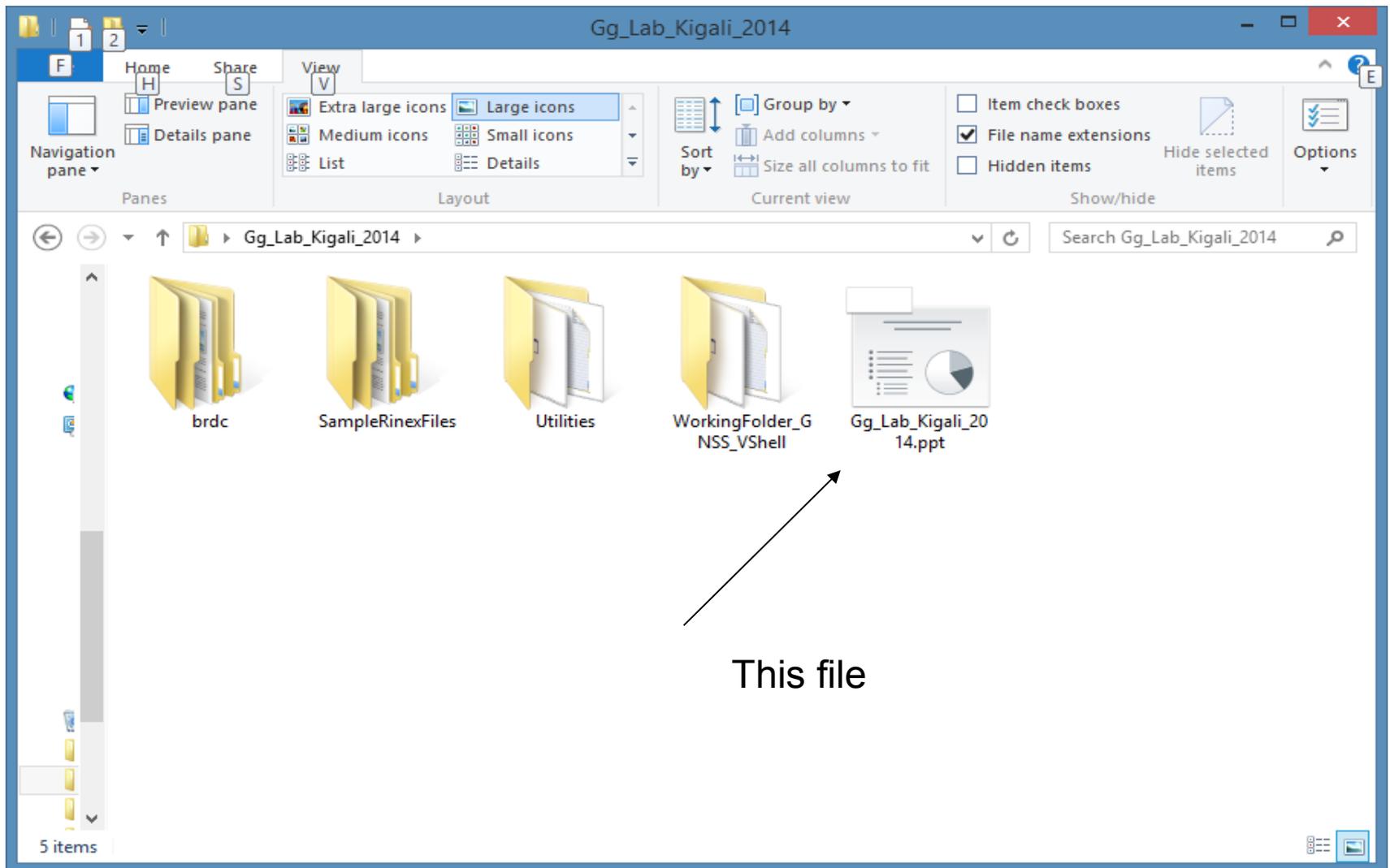
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The folder Gg_Lab_Kigali_2014



Content of *Gg_Lab_Kigali_2014* content

(4 folders + 1 file)

- **File:** this presentation.
- **Folder** *Use*
- WorkingFolder** *Basic*
- BRDC** *Basic*
- SampleRinexFiles** *Sample for exercise*
- Utilities** *Maybe useful*

Arranging the *GNSS_VShell* Program

Needed files are contained in the two folders:

1. *WorkingFolder* (can be freely renamed)

Containing

The executable *GNSS_VShell.exe*

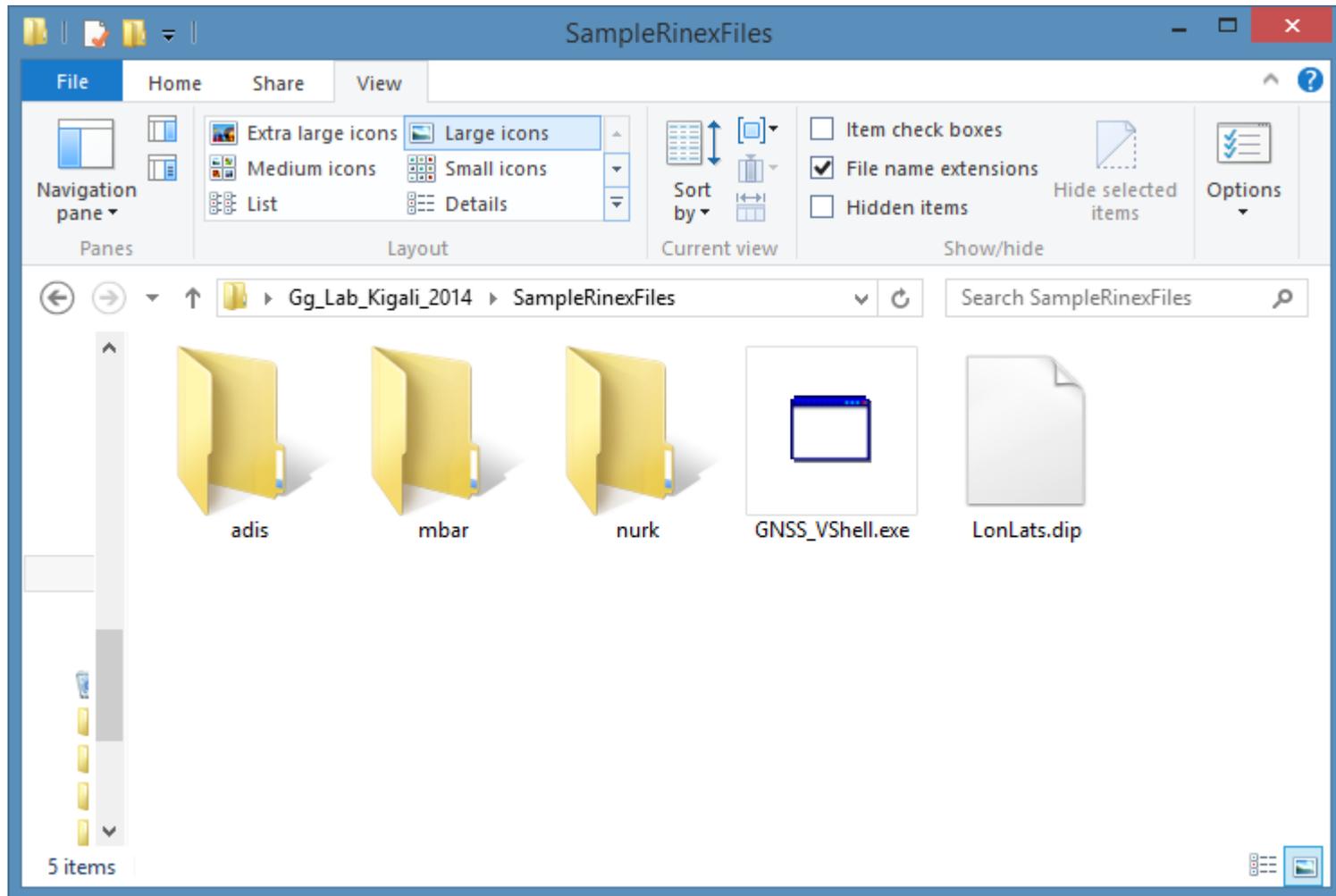
The auxiliary file *LonLats.dip*

As many folders as stations to be filled by the user
with the *Obs* corresponding Rinex files of the stations to be processed.

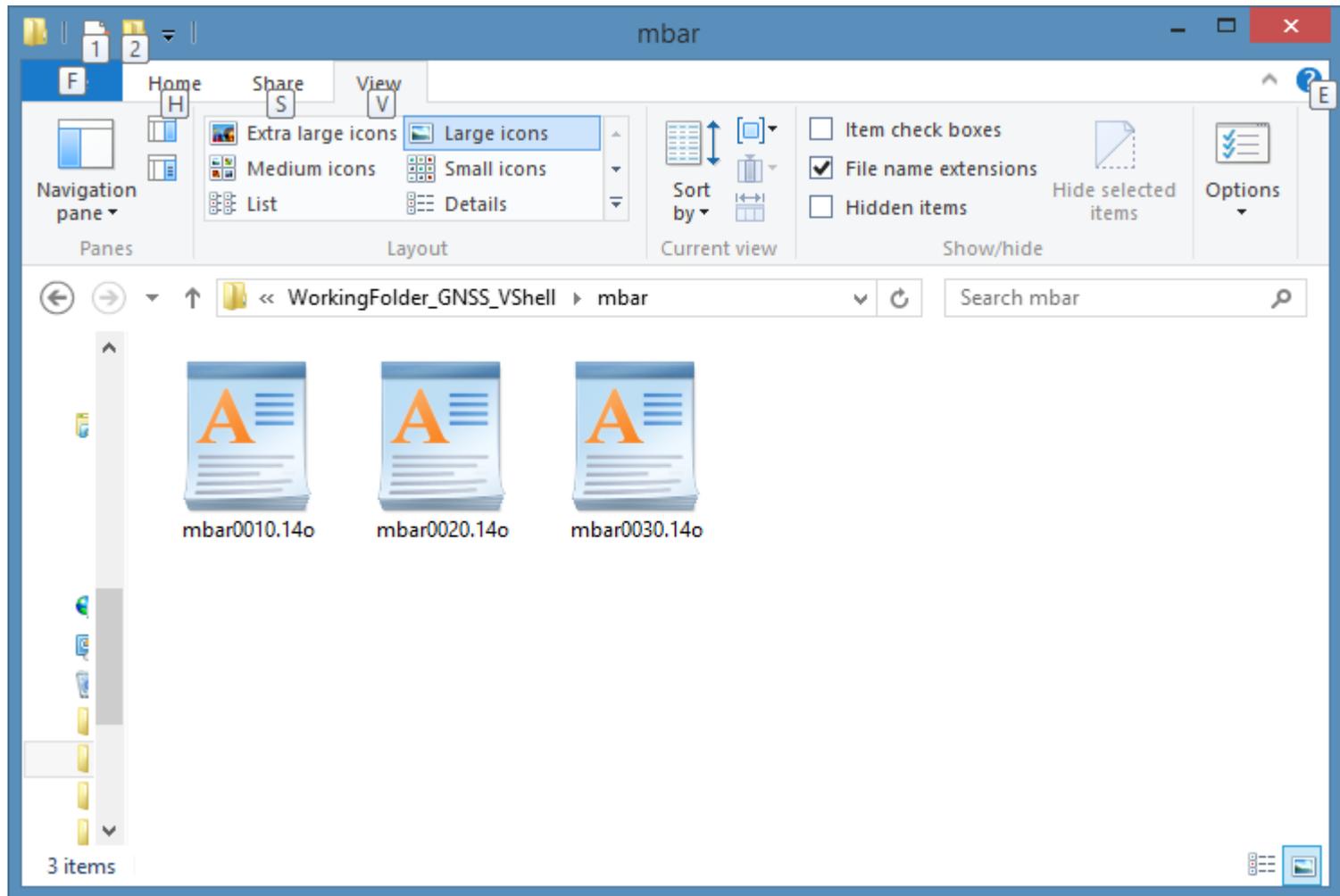
2. *BRDC* (Fixed name)

located anywhere in the computer, containing the *Nav* files *brdc* both for *GPS* and *GLONASS*

Sketch of *WorkingFolder* before running *GNSS_VShell*



“mbar” Folder



The **BRDC** Folder

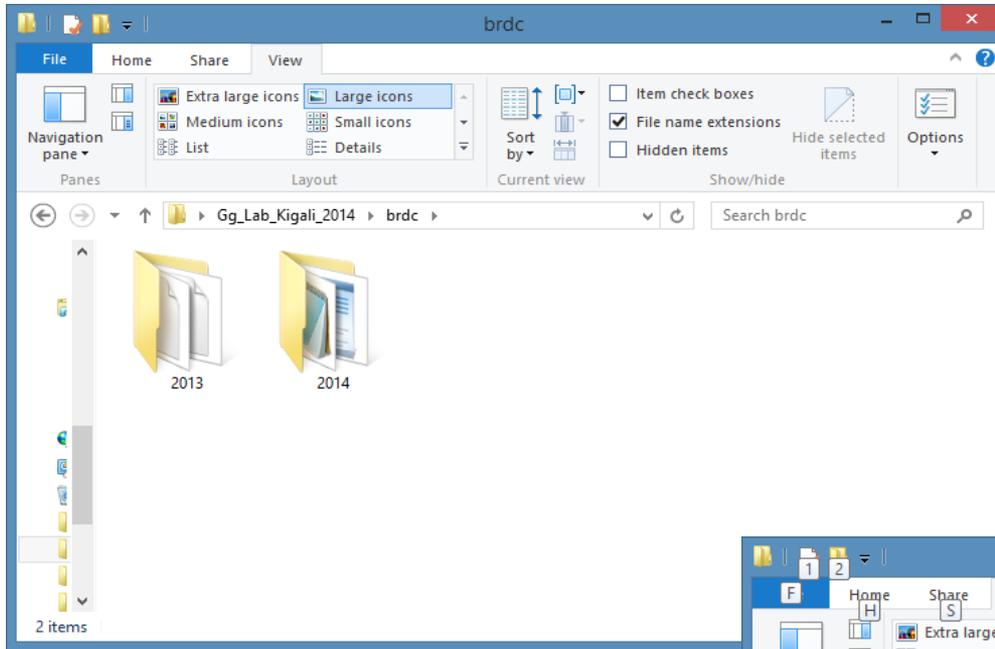
Can be located anywhere, provided you are able to give its right pathname when requested.

Contains the **Nav** files both for **GPS** and **GLONASS** arranged for years as shown in the next slide.

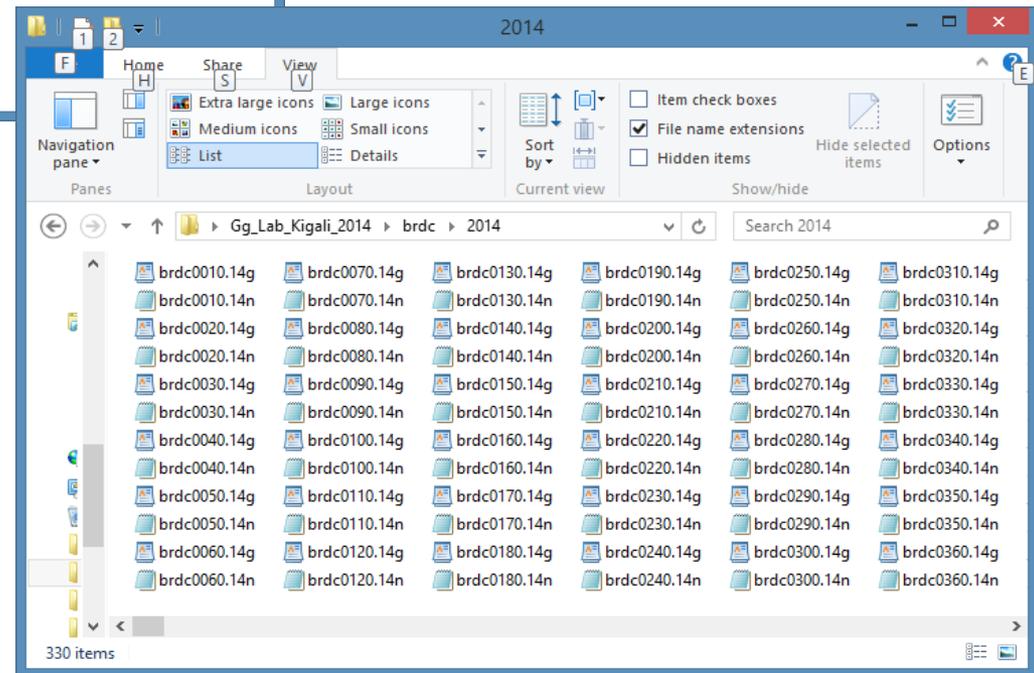
If needed, it will be updated by the downloaders as described in the following.

The available **BRDC** folder contains files for year 2013 and 2014

Sketch of **BRDC** Folder



BRDC files will be used for all stations: so better to have them ready for the years/days requested.



First Run

Running ***GNSS_VShell***, will prompt for requested settings creating

Calibration_Settings.txt

Following runs will use the settings of this file. To change settings:

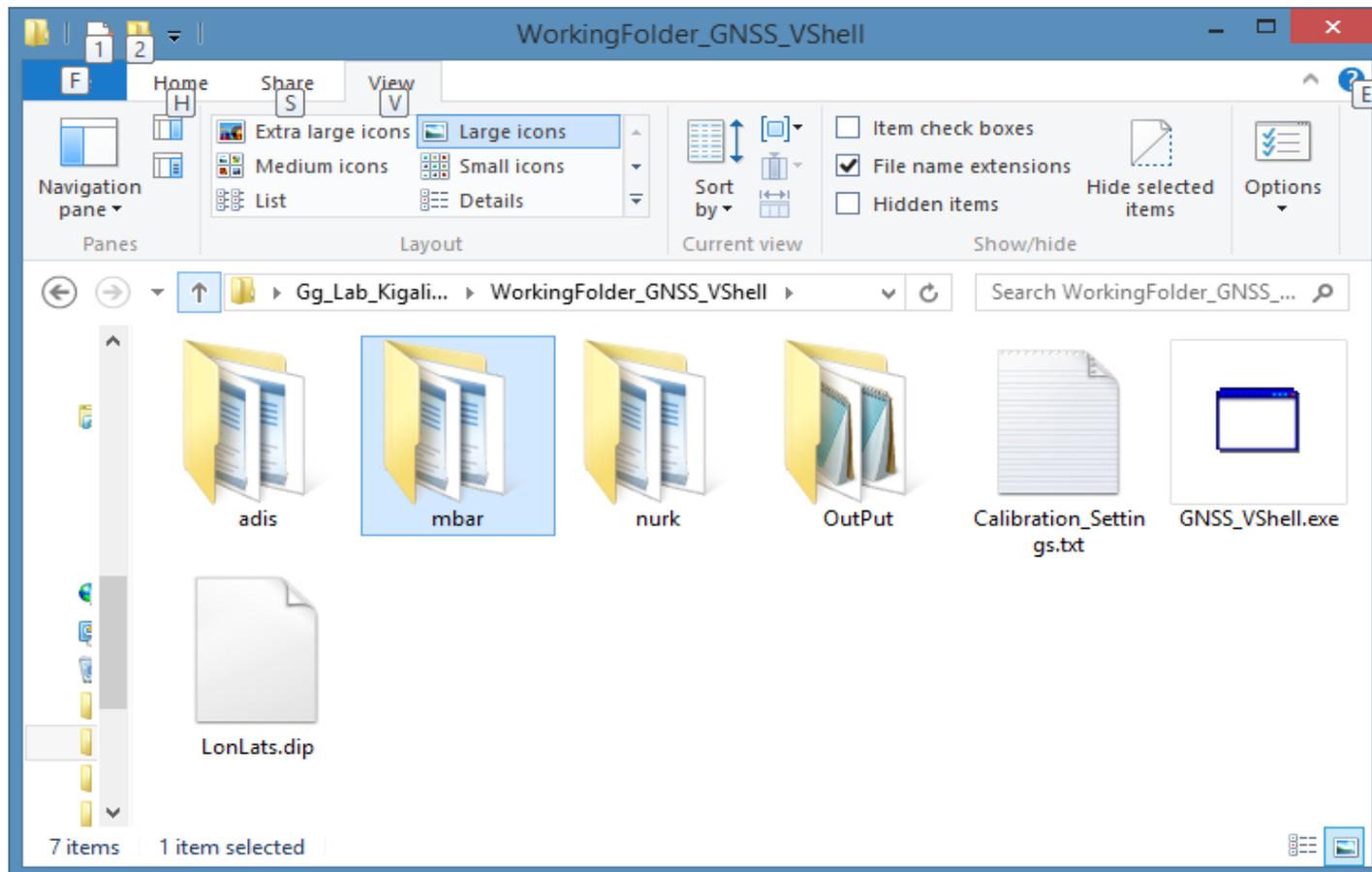
or edit the file (*Notepad* or other editor) with some care: but in case of mistakes, no panic: see next line

or delete it and at next run the user will be prompted for the new settings

During and after the run

The file *Calibration_Settings.txt* and the folder *OutPut* are created.

In case of successful run, *OutPut* will contain the results in the requested format. If unsuccessful, the output file will start with “_” (underscore)



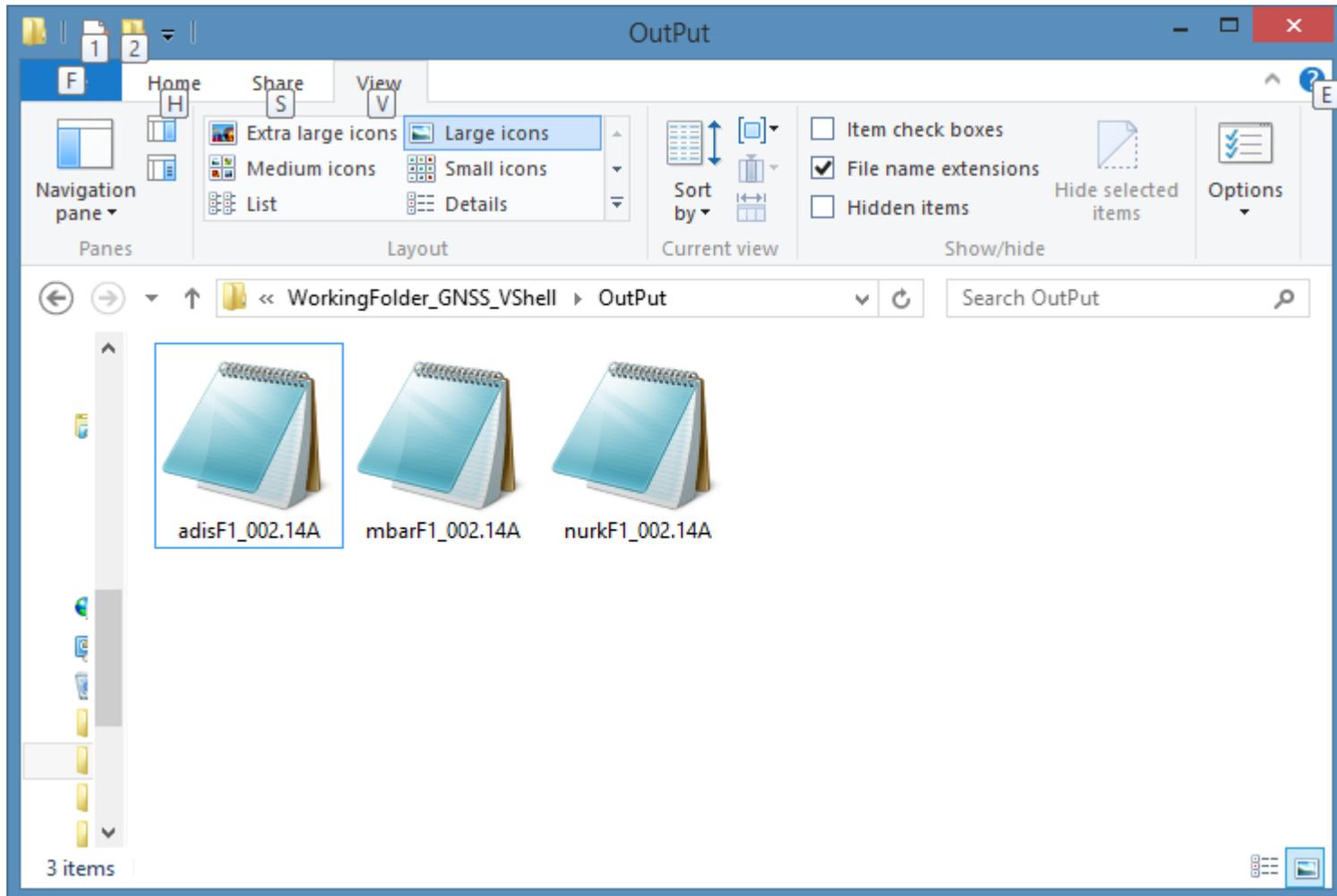
The content of Calibration_Settings.txt

(Default values in parentheses)

Output Sampling Time, Minutes	(5) (*)
Output Minimum Elevation, Deg	(10)
Solution: Arcs(A), Hardware biases	(B) (A)
Select Output Format	(X)
Folder of BRDC files	(X\Y)
Disable Rejection of First and Last Day	(False)
Shell Height	(400)
Discard GLONASS	(False)

(*) If zero, results will be output at the rate of RINEX file

After the run, folder output is created



The settings

Output Sampling Time, Minutes

Self-explaining. For the full rate of RINEX files input “0”

Output Minimum Elevation, Deg

Self explaining

Solution: Arcs(A), Hardware biases (B)

At present the hardware bias solution is not implemented (but the program will not prompt for it). Provided for future use.

Folder of BRDC files

Self explaining. Note that only the path of the folder containing *BRDC* is needed.

Discard GLONASS

Self explaining. Not to be used normally.

Select Output Format, Disable Rejection of First and Last Day

Require specific description in the following slides.

The settings (continued)

Disable Rejection of First and Last Day

The Arc solution has the disadvantage that data at the beginning and at the end of the processed period are less reliable. So the results of first and last day of the files in RINEX are rejected, and this should be the standard praxis:

Disable Rejection of First and Last Day = FALSE

If for some reason (i.e. a one day that has no files before and after it, or just to check the data of a single day) the flag will be set to TRUE.

The Output formats

When prompted, selection of output formats is like

Time/VTec at the station (0)

Time/PRN/PP Az/EI/VEq (1)

Time/PRN/PP Az/EI/Lon/Lat/VEq (2)

Time/PRN/PP Az/EI/Lon/Lat/Slant/VEq (3)

Time/PRN/PP Az/EI/Slant (4)

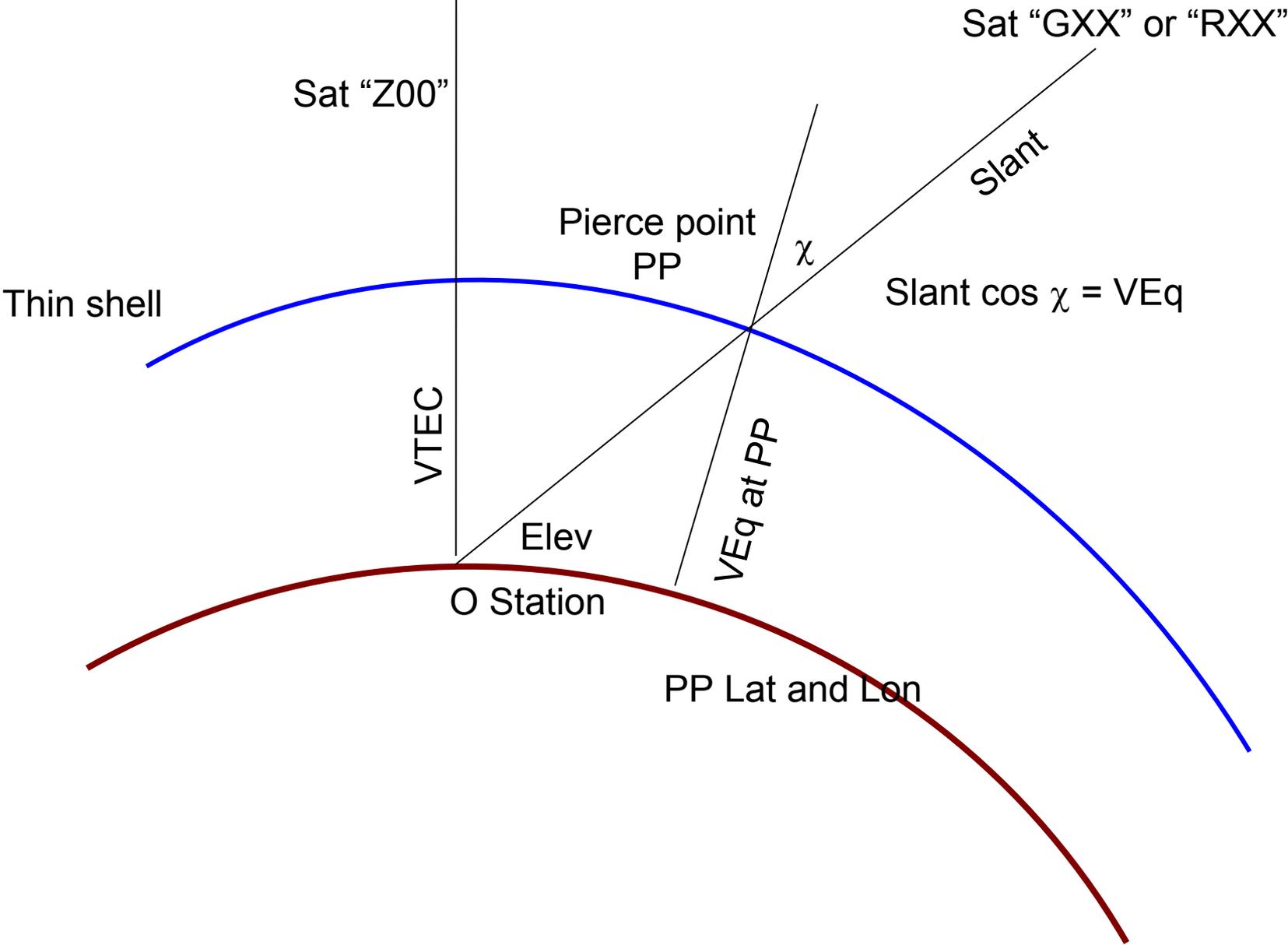
Where items refer to

Time: in seconds of day (0 – 86400)

PRN: One character for Satellite System (“G” for GPS, “R” for GLONASS, “Z” for a fictitious satellite present at each epoch at the zenith of the station) plus Satellite PRN# (1 -32) for GPS and Slot Number (1 – 24) for GLONASS, “00” for Z

Then following data will refer to a given Pierce Point (PP) of which Azimuth, Elevation, Latitude, Longitude (all Degrees) and VEq (Vertical Equivalent) are reported. For format (0), Z00 identification is dropped.

Sketch of "items"



Output sample

Format "0" ("Z00" skipped)

42000 +051.88

42300 +051.94

42600 +051.94

42900 +051.83

43200 +051.71

43500 +051.59

43800 +051.36

44100 +051.07

44400 +050.79

44700 +050.58

45000 +050.47

45300 +050.27

45600 +049.98

45900 +049.75

46200 +049.40

Output sample (continued)

Sample Format "1"

43200	Z00	000.000	90.000	+050.81
43200	R01	342.108	61.132	+049.32
43200	G21	049.625	25.108	+048.69
43200	R23	057.888	53.544	+050.81
43200	R24	352.156	27.866	+048.48
43200	G06	333.913	42.238	+048.59
43200	G03	326.594	26.290	+048.55
43200	G18	023.090	32.073	+048.27
43200	R08	020.676	16.154	+046.18
43200	R22	121.580	23.852	+053.47
43200	G14	143.715	52.864	+052.67
43200	G22	337.131	59.631	+049.56
43200	R02	234.995	43.321	+051.73
43200	G16	277.290	37.629	+049.60
43200	G29	129.193	21.853	+051.66
43200	G30	233.106	39.663	+052.02

Output sample (continued)

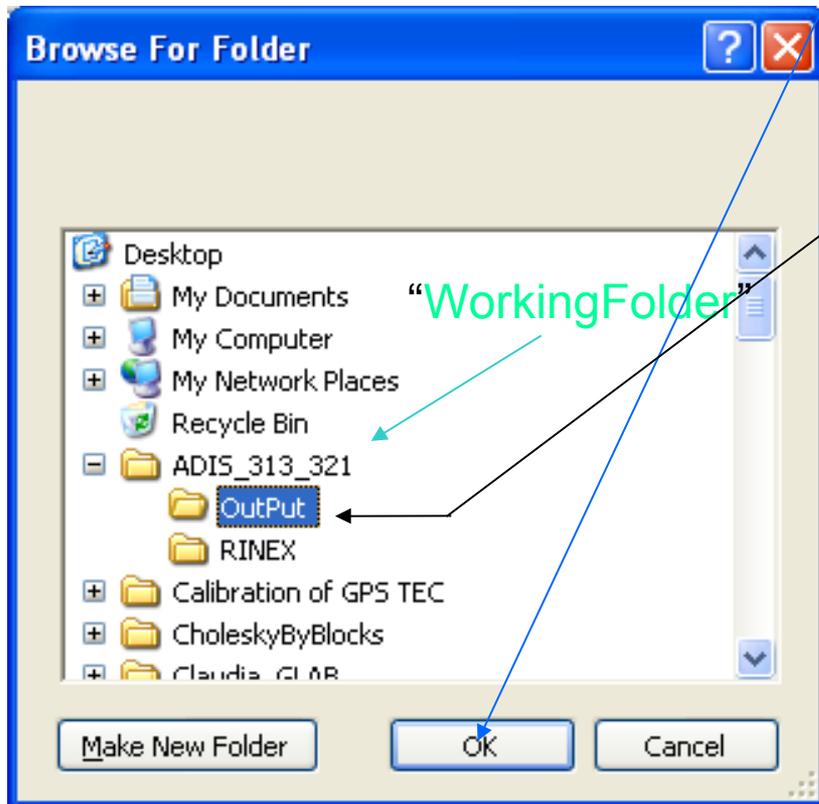
Sample Format "4"

43200	G23	267.740	59.229	+015.68
43200	G20	352.770	69.235	+012.83
43200	G11	184.523	35.026	+027.28
43200	G32	059.923	59.796	+014.25
43200	G01	186.906	60.715	+017.33
43200	G17	290.615	14.178	+035.79
43200	G13	246.080	32.234	+026.96
43200	G31	055.213	36.792	+019.38
43200	R03	044.192	46.499	+015.06
43200	R14	147.811	38.668	+023.90
43200	R18	220.321	19.657	+043.50
43200	R12	026.958	11.481	+033.49
43200	R04	323.450	40.288	+016.64
43200	R02	085.227	11.428	+038.69
43200	R13	072.387	47.446	+017.23
43200	R19	282.865	31.832	+022.69

UTILITIES

The “***Plot_Fx_Format.exe***” will perform rough plots of the content of Output files according to their format.

Once run, a dialog window will help in selecting the “Output” folder containing the files. Press **Ok**

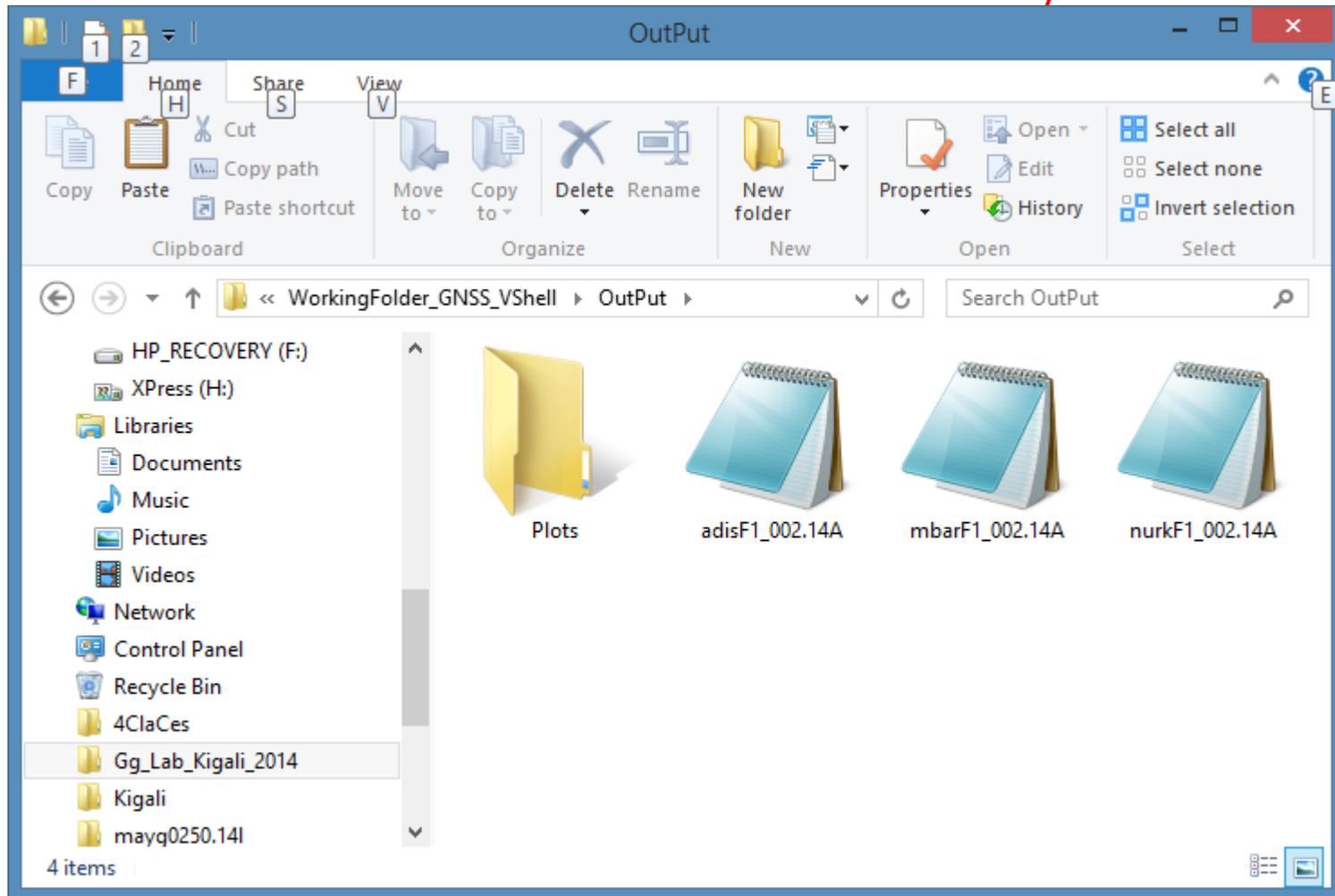


An input box will prompt for Maximum TEC range (default 100).

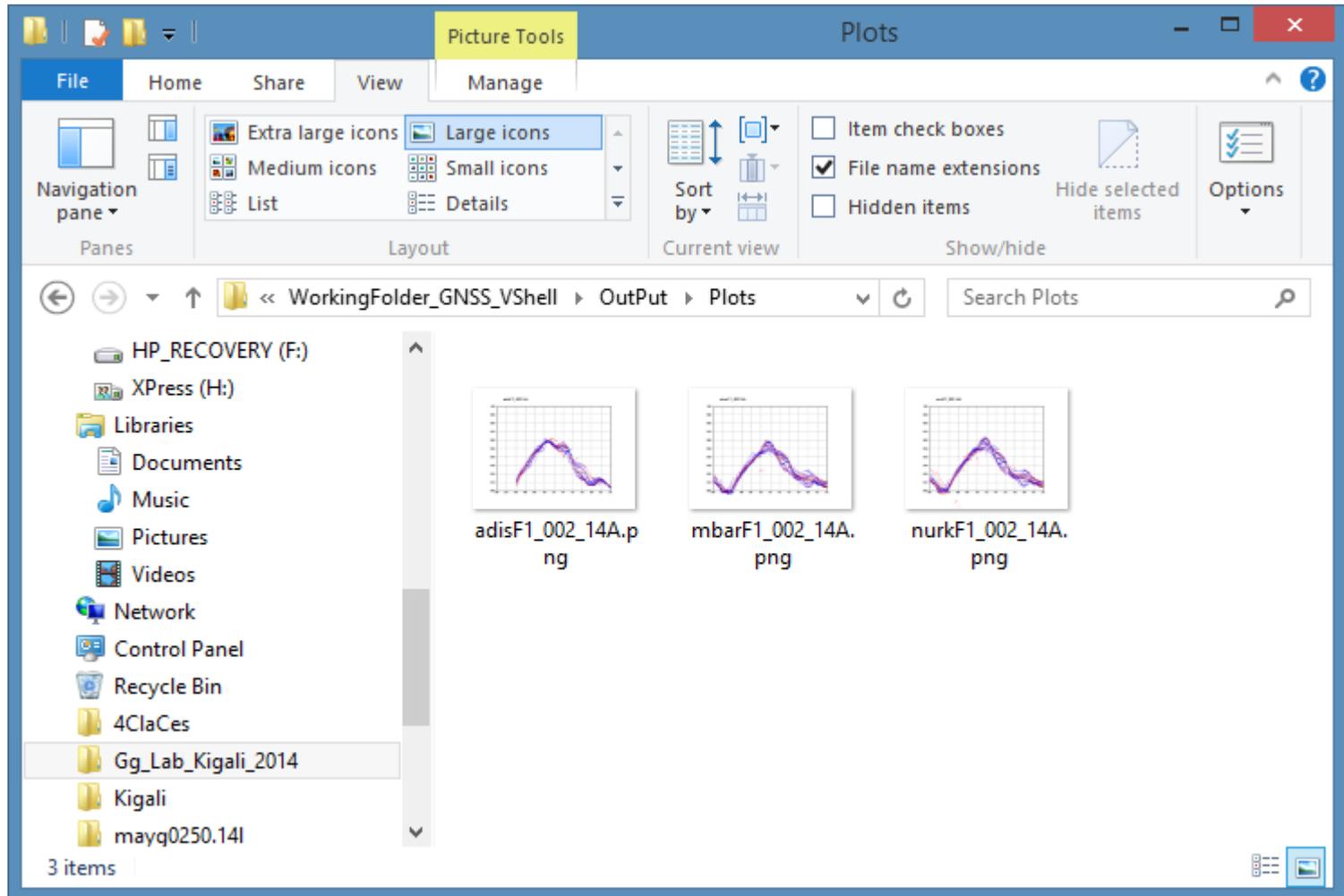
Be careful: sometimes the box is hidden by other windows. In this case locate it in the taskbar.

The rough plots will be output in the subdirectory “Plots” of “Output”

After running "***Plot_Fx_Format.exe***" the folder "***Plots***" is created



“Plots”



The DownLoaders

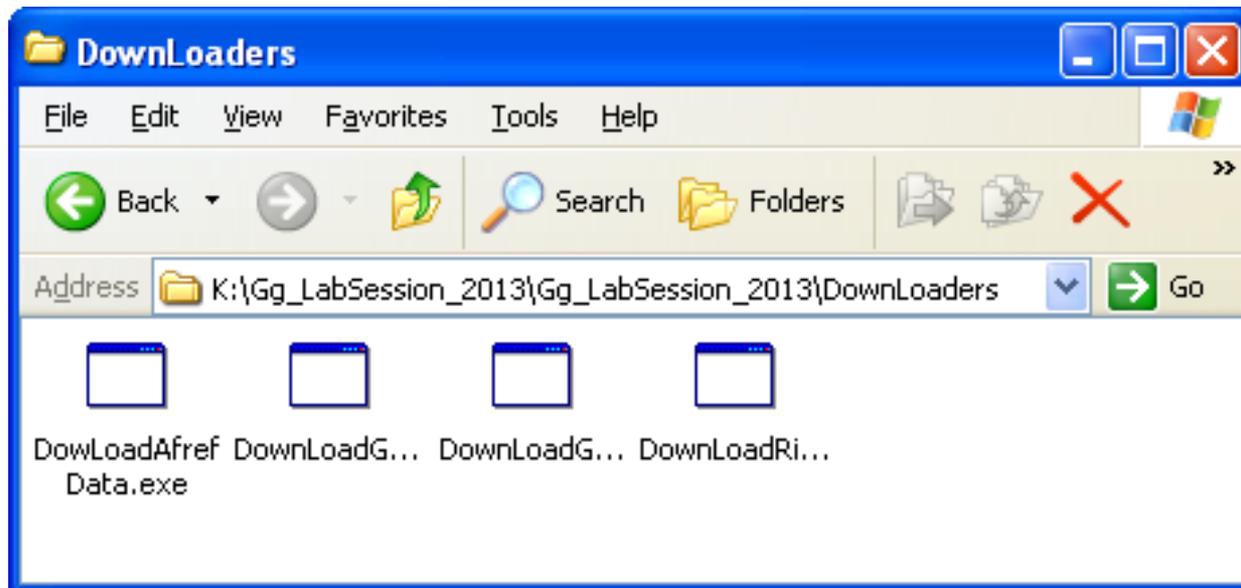
DownLoadGLONASS

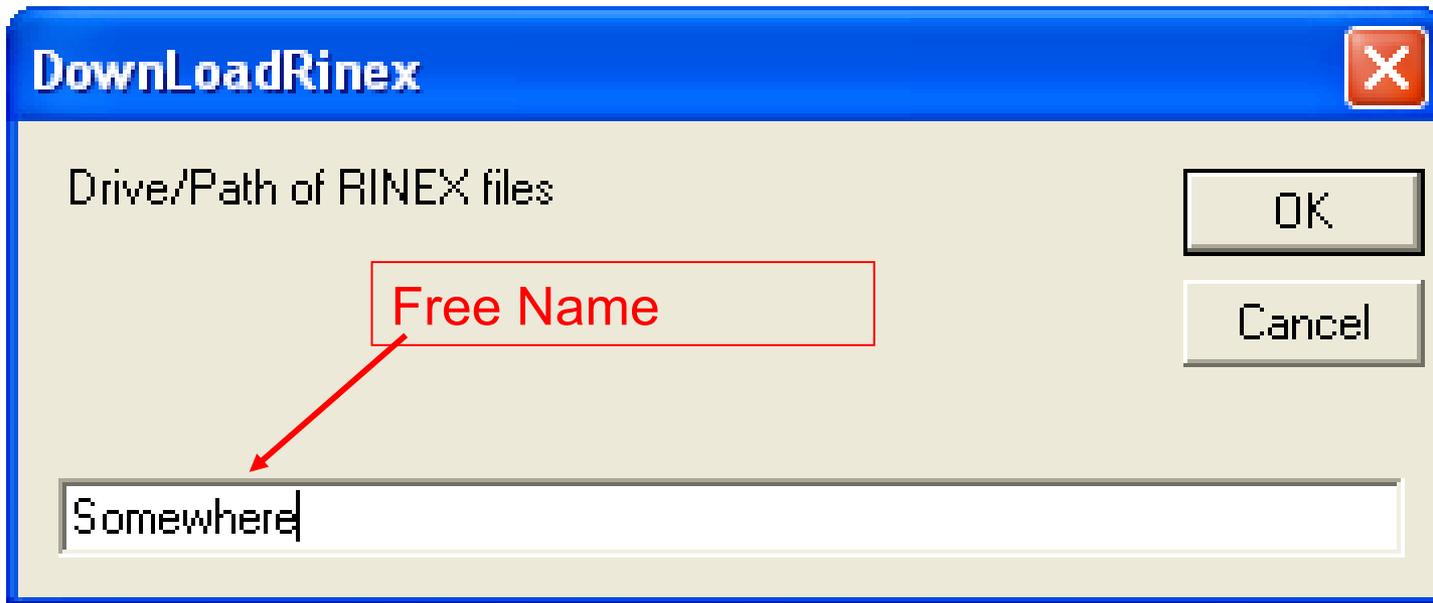
DownLoadGPS

DownLoadRINEX

DownLoadAfrefData

Will (possibly) help in downloading
RINEX **Obs** and **Nav** files

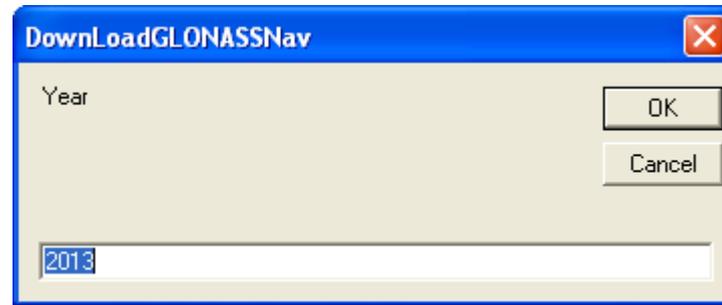




If not already created, a folder “**Obs**” will be created in “**Somewhere**”. RINEX files are arranged according to the IGS standard.

Answers to **Year, DayStart, DayEnd** are self-explaining

Input the how many stations you wish, closing with the null (default) string



The same for ***DownloadGLONASSNav*** and ***DownloadGPSNav***: if not present, the folder “***BRDC***” will be created in the requested folder (see above for its internal configuration). Once downloaded, unzip the ***Nav*** Files

Remarks

All the results will be stored in folder “*Output*”

Remember to put for each run the extra files before and after the days to process

Any number of (contiguous) days can be processed in each station folder

Wishing you non-negative TECs!!