

# VerifLocal V3.0

## User's Guide

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## VerifLocal

**VerifLocal** is a program that analyzes IGC flight recordings or files coming from the Condor simulator (**.ftr**). It allows to check whether a glider has remained within gliding range of Landable Areas (in the broad sense) during the flight (according to a Glide Ratio) and can determine some escape routes.

Low level flight may also be detected.

It is possible to use topographic data from Condor or LK8000.

Airspace can be displayed on the map and it is possible to detect the entry into the zones.

A batch mode enables to process multiple files without graphical display, see **ADVANCED USE**

The name comes from the French gliding expression: “rester en **local**”: “to remain within gliding range”

## RECOMMENDATIONS

This software is provided "as is" without any express or implied warranty. In no event shall its authors be liable for any damages whatsoever resulting from its use. The results provided are only indicative and cannot be used as proof. It is up to the user to check that the data used (list of LAs and airspace) are up to date.

The use of this software should in no case exempt the user from using his common sense.

As wind and aerology are not taken into account, it is recommended to keep heights and safety coefficients that correspond to the values commonly used.

### *Glide Ratio :*

- for IGC files, the default Glide Ratio used for computations is 20. If the glider type is clearly identified (the type indications in the IGC files are not always reliable) one can use half of the maximum Glide Ratio, otherwise it is recommended to keep the default value of 20 (or even less for "wood-and-fabric" ones), possibly 25 for 15m or 18m classes and above;
- for flights coming from Condor, if the option **[Parameters/Condor: automatic glide ratio]** is activated, the calculation glide ratio will be equal to half of the maximum glide ratio of the glider in question (defined in the Glider\_data.txt file); otherwise, the default calculation glide ratio will be used.

### *Escape routes*

Tracks towards LAs are shown only as a means of verifying their existence. If there are several, the selection of the one shown is made on arbitrary criteria (see below), so there is no guarantee that the track displayed is the best one. They can therefore only be recommended for actual flights after a thorough check.

### *Airspace*

Detection of entry into the zones is binary. In case of detection, it is up to the software user to check the activity of the zone in question and, if necessary, whether clearance has been obtained by the pilot.

### *Language and Units*

The software detects if the computer uses French; otherwise English will be used.

It is possible to force French or English if needed (see below **ADVANCED USE**)

For the time being, the software uses only metric units (meters, kilometres)

Support for Imperial or Australian units could be added at a later stage.

## USAGE

Only Condor Version 2 is supported

It is possible to read Condor (**.ftr**) or IGC (**.igc**) files, whether they come from **real or simulated** flights. During the same session it is possible to read both types of files.

Flights recorded in IGC files must be contained entirely in the area corresponding to the topography file (**.trn** or **.DEM**) specified in the configuration file **VerifLocal.ini**, section **[TrnFile]**.

This file can also be specified interactively, see below: **Menu/Terrain(IGC)** . The file must have been selected before you open the flight recording.

The displayed map can also be modified, see below: **Menu/Map(IGC)**

For more details, see § **TOPOGRAPHICAL DATA AND MAPS** below.

For Condor files, the landscape on which they have been recorded is automatically selected if it is installed on the computer, otherwise the same **.trn** or **.DEM** file will be used as for IGC files.

For each flight recording, the program will check if the glider is within gliding range of the Condor airfields (**.ftr** files only), as well as the Landing Areas (LA) defined in one or more **.cup** files (SeeYou format).

The list of these files must be in the configuration file **VerifLocal.ini** (see paragraph **PARAMETERS** configuration **.ini** file).

The program will try to detect the release at the end of the towing or winching operation as well as the entry into the landing circuit (2 km ~1.1NM from the landing point or cone of GR=10). For flight recordings from Condor, engine operation is also detected.

For the duration of the flight, the program will check (by default every 20 seconds) the possibility of gliding to a LA, in a straight line or in a broken line according to the glide ratio (see below) while respecting a safety height at arrival (300m ~1000ft by default).

## Escape routes

Please refer to the § **ESCAPE ROUTE SEARCHING ALGORITHM** for a more precise description of the algorithm.

This algorithm is neither optimal nor exhaustive and **does not necessarily find all possible routes**.

However, we consider that this is not essential as a careful observation of the map allows us to detect the few "false positives" that might remain.

To do this, it is also possible to manually construct an escape route.

"False negatives" are excessively unlikely because the height above ground of the clearance paths is very finely determined (every 90m ~100yds = horizontal resolution of the topographic data).

It is possible to display escape routes periodically (see below): only 1 clearance at each point of the path, in the direction of the LA:

1. the nearest one that can be reached above safety height (**green** on the map) ;
2. otherwise, the LA that can still be reached with the highest arrival height below safety height (**orange**) ;
3. alternatively, the trajectory towards a theoretically reachable LA: among all the escape routes that would allow to reach a LA in the absence of relief and which are blocked by the relief, the one that will come closest to the targeted LA (**red**).

In the first two categories, if more than one tracks towards LAs are found, the trajectory will be displayed first:

- towards an aerodrome, in a straight line, then in a broken line;
- otherwise to another LA, in a straight line, then in a broken line.

## Low-level flight

Low-level flight can be detected: the minimum height is defined by **[Parameters /Minimal height AGL (flight)]** (no detection will be performed if the value is zero).

The trajectory will be coloured purple and the cumulative time will be displayed in the barogram text (see below).

In order not to set off an alarm in case of safely carried out ridge flying, such trajectory points will not be taken into account if it is possible to go back above the minimum height by deviating from terrain along the line of greatest slope for 1km or less

# INTERACTING WITH THE SOFTWARE

## Start

To open a file, select **File/Open...** from the menu.

If you want to use drag and drop mode to start the program, it is recommended that you create a shortcut on your desktop. You can then drag a file (**.igc** or **.ftr**) onto the shortcut to scan it.

## Display

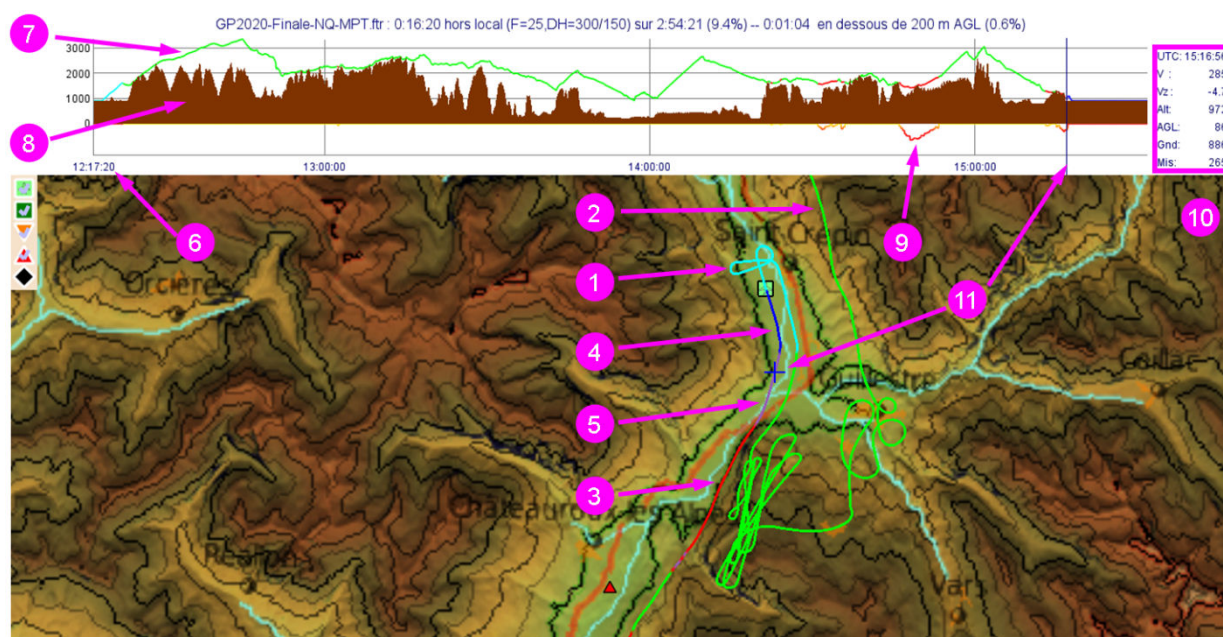
### Map :

At start-up the map is displayed on the whole window.

*Note : The map and barograms pictures have been taken directly from the French version of the manual but should remain understandable*

The colour of the trajectory represents:

1. **Cyan:** initial climb (tow, winch or motor start)
2. **Green:** the glider is within gliding range of a LA
3. **Red:** the glider is not within gliding range of a LA
4. **Blue:** landing circuit.
5. **Purple:** low-level flight (if detection is activated)



### Barogram :

It is located above the map or on the full page (see Display menu).

You can see:

6. Time (UTC, abscissa) ;
7. the altitude of the glider (top curve, same colors as the trajectory on the map);
8. ground elevation (**brown**) ;
9. downwards (from **yellow** to **red**) the height missing to be within gliding range of a LA (straight line only) ;
10. information (5, 6, 7 and 8) condensed for the active point;
  - UTC : time
  - V : velocity
  - Vz : climb/sink rate
  - Alt : altitude
  - AGL: height above ground
  - Gnd : ground elevation
  - Mis : missing height
11. The active point is represented by a vertical blue line on the barogram and by a blue cross on the map.

Airspace information is described in the relevant paragraph.

The text above the barogram indicates:

1. file name ;
2. time spent outside gliding range of LAs (=“hors local”) (duration) ;
3. Glide Ratio used for the calculation (F=**GR**, below : 25); [**Working\_L/D**] (or auto) ;
4. safety height on arrival (DH=**HHH**/ggg, below : 300); [**Safety\_height**];
5. minimum height above ground level (DH=hhh/**GGG**, below : 150) [**Ground\_clearance**] ;
6. if applicable, if the calculation was made with altitude corrected for kinetic energy (TE) ;
7. total flight time;
8. time spent outside gliding range (percentage) ;
9. time spent below the minimum flying height (if detection is activated) ;
10. minimum flight height [**Min\_AGL\_height**] ;
11. percentage

aa28.igc : 0:38:04 hors local (F=25,DH=300/150,TE) sur 2:26:24 (26.0%) -- 0:03:33 en dessous de 200 m AGL (2.4%)



When the map and the barogram are displayed simultaneously, if the mouse is moved over the barogram, a cross indicates the position of the glider on the map (active point) and details are displayed to the right of the barogram.

If you click on the barogram with the left mouse button, the map is centered on the corresponding position.

If the mouse cursor is placed on the trajectory, the index of the barogram is positioned at the corresponding moment.

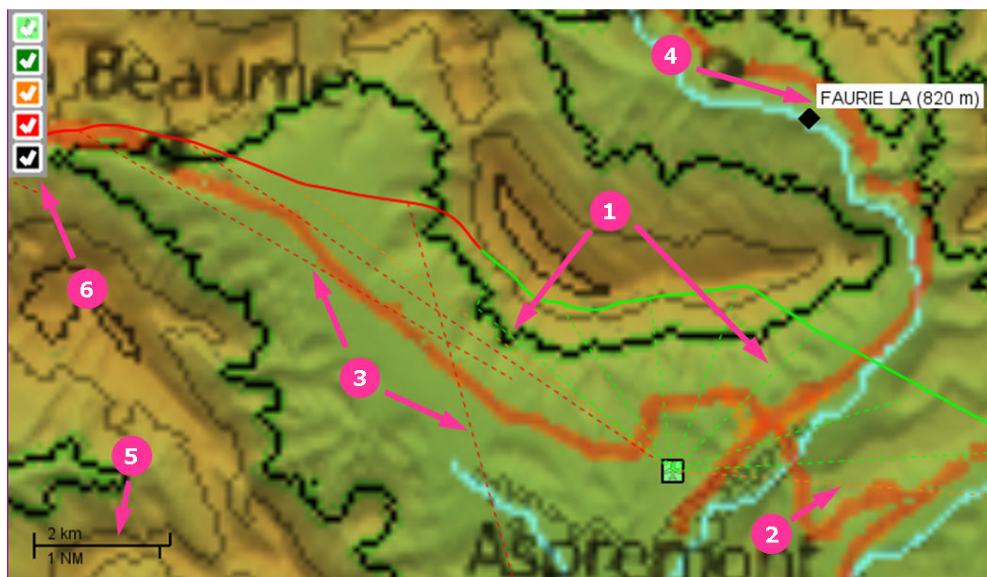
It is also possible to activate the automatic centering of the map (in the Display menu).

### Escape routes

The track displayed (dotted lines) is in the direction of the LA:

1. nearest one that can be reached above safety height (**green**) ;
2. otherwise, the one that can be reached with the highest arrival height below safety height (**orange**) ;
3. or, alternatively, the trajectory towards a theoretically reachable LA that will come closest to it (**red**).

If no LA is theoretically reachable, no track will be displayed.



### Miscellaneous information

4. If the mouse passes over a LA the corresponding name and elevation are displayed.
5. The scale in the lower left corner is automatically adjusted (value or line length)
6. Selecting LAs by difficulty (see below)



## Escape routes altimeter profiles

When escape routes are displayed, right-clicking on a track brings up the corresponding altimeter profile in the lower left corner of the map; the active track is highlighted (**magenta**). The colour of the track in the profile window is the same as on the map (**green**, **orange** or **red**).

The profile disappears when you right click again.

It reads:

1. time corresponding to the starting point on the trajectory;
2. distance flown (in a straight or broken line) ;
3. height difference between the start of the route and the LA
4. (theoretical) glide ratio needed to achieve it (without any margin)
5. name of the LA reached (or targeted);
6. elevation of the LA reached (or targeted);
7. if the LA is reached, the height above the ground at arrival;
8. a graphical indication of the safety heights on the vertical axis to the right.



**Note:** In the case of **orange** routes, the difference between the arrival height (7) and the minimum height may not correspond to the missing height displayed on the barogram (MIS). This occurs if the selected route is towards an aerodrome, but there is another route arriving higher on an LA not classified as an aerodrome and which will not be retained therefore

## Manually determined escape route

It is possible to manually determine a broken line escape route.

Position the cursor on a point of the path so that a blue cross appears, then press the "M" key.

The cross will turn orange and it will be possible to move the new point with the mouse (without clicking). The ground track will be visible on the map as yellow dotted lines. The elevation profile will be displayed.

To add another point, press the "M" key again.

To finish entering points, left-click.

To select a point, click on it with the left button, the cross will become orange.

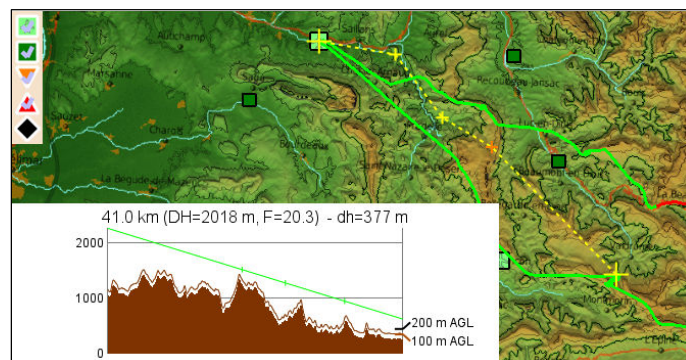
It is then possible to:

- move the active point (as above);
- delete the active point, press the DELETE key;
- insert a new point before the active point, press the INSERT key.

To deselect the active point, left click.

The starting point of the escape route cannot be changed.

The profile display is similar to the one shown above, but the path does not stop when it meets the relief.



The ground track and elevation profile are erased by right-clicking.

## Selection of LAs used

It is possible to select which LAs will be used for the calculation. The selection is made by level of difficulty according to the information found in the .cup file(s) (see below):

0. airfields ("aircraft" logo on light green background)
1. easy fields or set of fields or no information found (dark green square)
2. medium (orange point-down triangle)
3. difficult (red triangle)
4. very difficult (black diamond)



To select/unselect a level of difficulty, click in the corresponding box in the top left corner of the map (see above); all LAs at that level will be selected/unselected.

It is also possible to select/deselect individual LAs by clicking on them with the left mouse button.

It is possible to save the current LA selection into a text file (Menu/Save LA list) which can be read (Menu/Read LA list). If a list has been read or written, the corresponding filename will be saved into the configuration file when saving that file, otherwise the selection level list will be saved.

The re-calculation is not automatic, the flight track will turn grey as soon as a check-box or an individual LA has been modified.

The display will turn back to normal once a re-computation is performed (Menu/Recompute or [F5] key)

Only the theoretically reachable LAs will be displayed. If the **Show\_unreachable** parameter is set to 1 in the .ini file, all the LAs located in the working rectangle (grey dotted line on the map) will be displayed.

## Zoom and Pan

The map can be moved by clicking and dragging it with the left mouse button.

It is possible to zoom in and out:

- by clicking on the middle mouse button and moving it vertically ;
- by using the mouse wheel;
- by using the keyboard shortcuts [CTRL][+] and [CTRL][-] (numeric keypad).

You can return to the initial zoom by using the keyboard shortcut [CTRL][\*] (numeric keypad).

You can restore the original view by using the keyboard shortcut [CTRL][HOME].

## Keyboard shortcuts

It is possible to start a re-calculation by using the [F5] key.

It is possible to save a screenshot (JPEG or PNG) by using the [F8] key.

To toggle the airspace display mode, use the A key (see below).

## AIRSPACE

It is possible to display the airspace and to detect penetration into the zones. The zones must be defined in an OpenAir (.txt) file, not provided in the distribution.

This feature can also be used to detect, for example, low-level flight in mountain passes during competition events in mountainous areas. Simply create a file containing fictitious zones. To do this, it is possible to convert Condor penalty zones (quadrilaterals only) to OpenAir format using the Condor flight plan converter: CoTaCo

If a file has been defined and the display has been selected (**Display / Airspace** in the menu or **Show Airspace=1** or **2** in the .ini file), the airspace will be displayed in a simplified way using colours defined in the file (red will be lighter), or default values.

Only zones with at least one point close to the trajectory will be displayed. If the **Show\_unreachable** parameter is set to 1 in the .ini file, all areas with at least one point in the working rectangle (grey dotted line on the map) will be displayed.

Detection of the interaction of the trajectory with the airspace is possible, you have to select **Parameters/Check Airspace** in the menu, or activate **Check Airspace=1** in the .ini file, or add the **-AS** option on the command line.

The detection is done with the same frequency as the gliding range determination. If a point of the trajectory is inside an activated zone, an orange cross (X) will be added on the trajectory (1) and an orange mark will be made on the lower horizontal axis of the barogram (2). The time spent in each zone will be displayed in the file **name\_SUMMARY.txt** and the total time will be added at the end of the barogram text (3),(4).

You can toggle the display of the zones between all active zones and only those for which penetration has been detected by selecting **Display/ Zones Penetrated** in the menu, or **Show Airspace=2** in the .ini file or by using the "A" key.

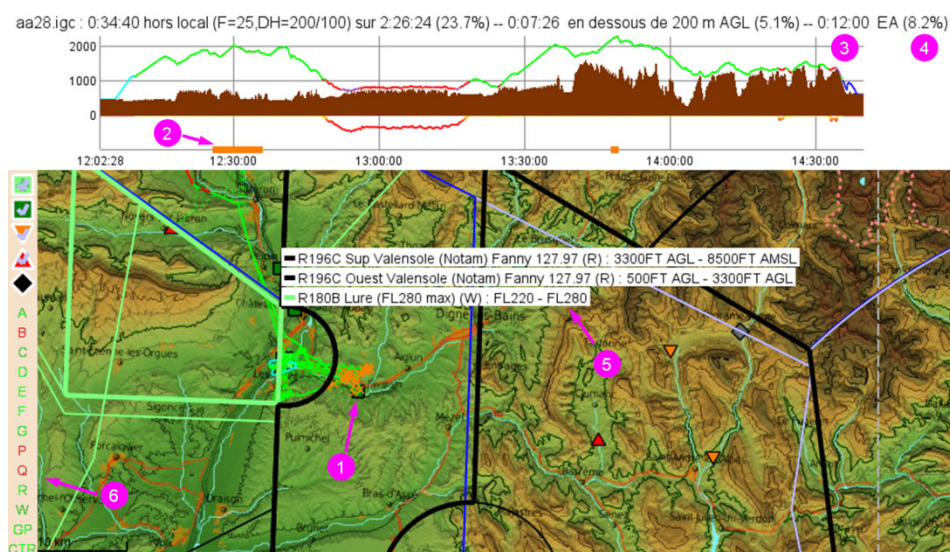
To display information about an airspace segment, move the mouse over a corner or along a boundary (detection points are about 2km ~1NM apart). Selected airspaces will be bolded and labelled with information from the AN (name), AC (class), AL (lower limit) and AS (upper limit) fields.

### Selection of classes :

When airspace is displayed, a class (AC) selection bar is displayed vertically on the left side of the screen below the selection of the LAs (6). Active areas are green, otherwise red. Click on a label to toggle the status of the corresponding class.

The re-calculation is not automatic, the flight track turns grey as soon as a class has been modified.

The display returns to normal when a recalculation is performed (**File/Re-compute** or **[F5]** key).





## FILES CREATED

At each run, a summary of the results will be added at the end of the **VerifLocal.log** file that will be created if it does not yet exist.

For each flight recording processed, a summary is written in the same folder and named **name\_SUMMARY.txt**. It contains a reminder of the main parameters (glide ratio and safety heights), as well as the times and positions of the entries and exits of "within gliding range":

Local OK	12:08:52	44°02'32"N	005°58'33"E	1115m
Sortie local	12:47:55	44°12'05"N	005°54'09"E	1118m

### Modified IGC files

The software does not allow 3D visualization.

If desired, or for archiving purposes, it is possible to save modified IGC files in which a fictitious indication of engine operation is inserted, equal to the height missing to be within gliding range, clipped to 900m ~2900ft (if it is null, the glider within gliding range)

The trajectory alone will be recorded in a file named **name\_LOCAL.igc**.

If the escape routes are displayed, they will be added to the trajectory and the file name will be **name\_PATHS.igc**. To be fully usable, these files must be viewed with software or on a website that takes into account engine operation.

This is possible, among others, with SeeYou (select "Engine noise level" to colour the trajectory).

On line, it is also possible on the <https://igcviewer.bgaladder.net> website

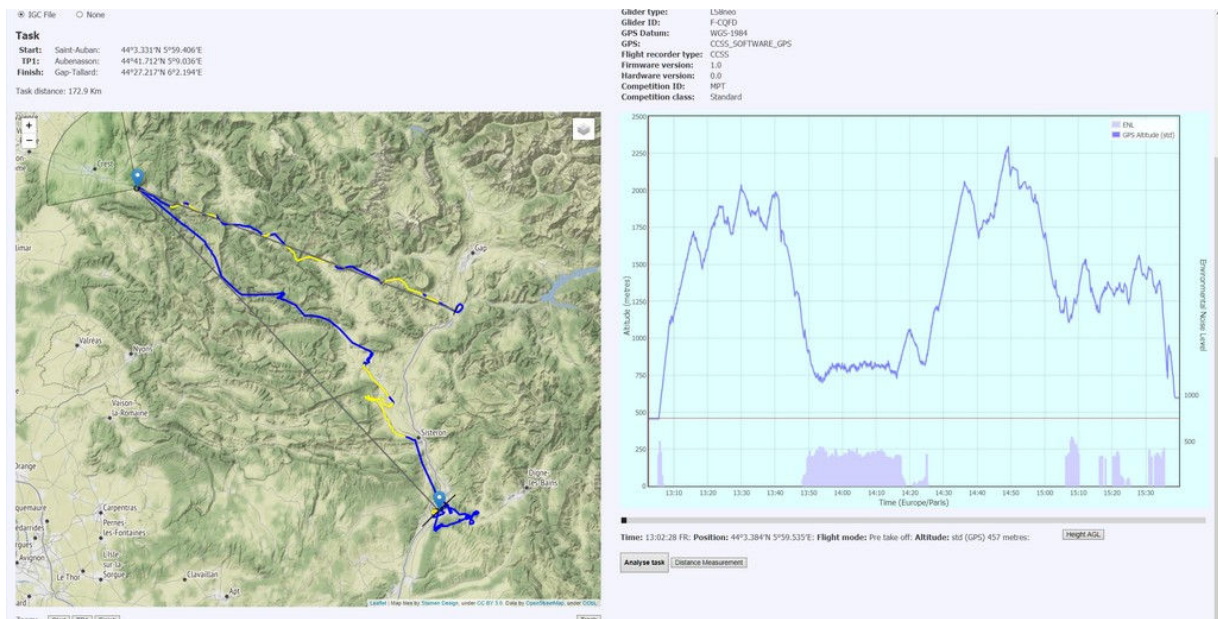
The engine operation detection must be activated with the following parameters:

ENL engine detect: ☐ Off ☒ On

Threshold:  (1-1000)

Time required:  seconds

Save configuration: ☐



## MENUS

If a menu item corresponds to a parameter defined in the **VerifLocal.ini** file, the name and possibly the value are indicated between square brackets. **[name=value]**

### *File/Open IGC or Condor file...*

Opens an IGC or **.ftr** file (Condor flight track) and determines whether the glider remained within gliding range and the escape routes according to the options selected.

### *File/Re-compute(F5)*

Determines whether the glider remained within gliding range and the escape routes according to the options selected. The [F5] key can be used to start the re-calculation.

### *Fichier/ Screenshot [F8]...*

Takes a screenshot and saves it to a JPG (default) or PNG image file

### *File/Save modified IGC file...*

Opens a selection window for the modified IGC file (see above)

### *File/Quit*

Ends program execution

### *Config./ Terrain (IGC)*

Allows you to change the topographic data file (**.trn** or **.DEM**) used for IGC files.

For **.trn** files: if it exists, the default map (**name.bmp**) will be selected; otherwise the user will be prompted to select one that must match the defined topography (**.trn**) file.

The file change will only be taken into account when the next file is opened.

### *Config./Map (IGC)*

Changes the map (**.bmp**) used for IGC files (only when a **.trn** file is selected)

The selected map must match the topography (**.trn**) file defined.

The map change will only be taken into account when the next file is opened.

### *Config./Airspace*

Allows you to change the airspace file that will be displayed

The map change will only be taken into account when the next file is opened or if the airspace display is deactivated/activated in the Display menu.

### *Config./Add CUP file*

Allows you to add a **.cup** file to the list (10 max)

It is not possible to remove a file from the list; it must be done directly in the configuration file.

### *Config./ Save LA list.*

Saves the list of selected LAs into a text file [**LA\_select**]

### *Config./ Load LA list*

Reads the list of selected LAs from a text file [**LA\_select**]

### *Config./Save config.*

Saves the current configuration in the **VerifLocal.ini** file.

The previous version is renamed to **VerifLocal.ini.bak**.

### *Config./Save config as....*

Saves the current configuration to another file.

If the file does not yet exist, you have to enter the file name: **my\_file**

The **.ini** extension will be automatically added to the filename if not specified.

If it exists, the previous version is renamed to **my\_file.ini.bak**

### *Config./ Load config. ...*

Loads the configuration from a file.

The parameters will be taken into account when the next file is opened or if a re-computation is launched (except for terrain and map)

### *Display/Tracks towards Landable Areas*

Toggles the display of escape routes on the map. [**Show\_paths**]

Click on File/Re-compute to refresh the display if the "Automatic re-compute" option is not enabled.

### *Display/Change current map*

Allows you to select an alternative map

This map will not be saved in the configuration.

The selected map must match the selected Condor landscape or the topography file (**.trn**) defined for IGC files.

### *Display/Relief Shading*

Selects a map with relief shading

This map will not be saved in the configuration.

In order to limit the calculation time, it is restricted to the theoretically reachable area.

### *Display/Map*

Selects the display of the map only

The default display mode can be set in the **.ini** file [**Display\_map=1**]

### *Display/Barogram*

Selects the display of the barogram only [**Display\_map=2**]

### *Display/Both*

Selects the display of both map and barogram [**Display\_map=3**]

### *Display Auto. center*

Toggles the auto centring mode: the map is automatically centred on the position of the glider when the simultaneous display of the map and the barogram is active.

### *Parameters/Glide Ratio*

Allows to change the glide ratio used for calculations (see §RECOMMENDATIONS). **[Working\_L/D]**

Warning: this value does not correspond to the maximum glide ratio of the glider.

Allowed values: [5-99]

The glide ratio value will be displayed in the information bar of the barogram (F=GR).

Click File/Re-compute or hit the [F5] key if necessary to refresh the display.

### *Parameters/Condor: automatic glide ratio*

Toggles the automatic glide ratio determination for Condor flight recordings **[Auto L/D]**

If the option is not activated, the glide ratio will be the default glide ratio or the one defined by the user.

Changing this option will only be taken into account when the next file is opened.

### *Parameters/Safety height at arrival*

Allows you to change the minimum height at the finish (in meters) **[Safety\_height]**

Minimum value: 50m (~160ft)

The value will be displayed in the information bar of the barogram (**DH=HHH/ggg**)

Click File/Re-compute or hit the [F5] key if necessary to refresh the display.

### *Parameters /Minimal ground clearance*

Allows you to change the minimum height at the finish (in meters) **[Ground\_clearance]**

Minimum value: 50m (~160ft)

The value will be displayed in the information bar of the barogram (**DH=hhh/GGG**)

Click File/Re-compute or hit the [F5] key if necessary to refresh the display

### *Parameters / Minimal height AGL (flight)*

Change the minimum height during flight (in metres) **[Min\_AGL\_height]**.

Minimum value: 0m (deactivates the control)

The value will be displayed in the information bar of the barogram (**below HHH m AGL**).

If necessary, click File/Recalculate or press [F5] to refresh the display.

### *Parameters/Check Airspace*

Toggles the detection of penetration into activated areas of airspace **[Check Airspace]**.

If necessary, click File/Recalculate or press [F5] to refresh the display.

### *Parameters/ Automatic re-compute*

Enables or disables automatic re-calculation

### *Parameters/Total Energy*

Toggles the use of altitude corrected by kinetic energy

If this option is enabled, it will be displayed in the barogram information bar (**TE**)

Click File/Re-compute or hit the [F5] key if necessary to refresh the display

### *Parameters /Computing frequency*

Allows you to change the calculation frequency (in seconds) **[Time\_step]**

Minimum value: 10s

Click File/Re-compute or hit the [F5] key if necessary to refresh the display

### *Parameters /Track display frequency*

Changes the frequency of the display of the escape routes (every N calculations) **[Paths\_frequency]**

Minimum value: 1

Click File/Re-compute or hit the [F5] key if necessary to refresh the display

### *Help/ Manual*

Opens the manual with the default software for PDF files

### *Help/ About...*

Displays version number



## PARAMETERS : configuration file (.ini)

Most parameters can be changed interactively.

It is possible to save the configuration if it has been changed.

It is possible to save the configuration in another file, which allows, for example, to work on different areas.

It is possible at any time to reread a configuration file (the parameters will be taken into account when the next file is opened).

All parameters that can be modified are defined in the **VerifLocal.ini** file and can also be changed by editing this file with a text editor (Notepad or other).

Comments (#) in the file should be self-explanatory.

If a file name is preceded by **%INST%**, this file will be searched in the VerifLocal installation folder.

Otherwise, if only the file name is specified, the file will be searched first in the folder where the program is running, and then, if not found, in the installation folder.

An example file is in the appendix.

- Window Size                      window size (width x height) pixels
- Display\_map :                    default display mode (default : both map and barogram)
- Time\_step :                      periodicity of the checks (20 seconds by default)
- Paths\_frequency :               periodicity of the display of clearance paths (default : 2)
- Show\_paths :                    display of clearance paths (default: 0=NO)
- Show\_unreachable               display of unreachable LAs and airspace (default 0=NO)
- Safety\_height :                  safety height on arrival at the LA (default: 300m ~1000ft)
- Ground\_clearance :              minimum height above ground (default:150m ~500ft)
- Min\_AGL\_height :                minimum height above ground during flight (default 200m ~650ft)
- Working\_L/D :                   glide ratio used for computations (default: 20)
- Auto L/D :                       determine glide ratio from glider type (**only for Condor**)
- L/D\_Sfty\_Fact :                  glide ratio safety coefficient **only for Condor** (default : 50%)
- LA\_select :                      if file name=list of selected LAs, otherwise selection by difficulty level
- TrnFile :                        topographic data file (only for IGC files, extension: **.trn** or **.DEM**)
- MapFile :                        map file name (only for IGC files, extension: **.bmp**)
- CupFile :                        Landable Areas file(s) (SeeYou format, extension: **.cup**, max 10 files)
- AirspaceFile                    airspace file (OpenAir format, extension: **.txt**)
- Check Airspace                  airspace check active
- Show Airspace                  display airspace
- Active Airspace Classes           list of active airspace classes
- Condor 2 path                   path to the Condor installation folder
- Optimise                        optimisation of « large »files
- 
-

## TOPOGRAPHIC DATA AND MAPS:

In the case of the Condor files we will obviously use the data and maps of the Condor landscapes (based on SRTM data with a mesh size of 90m ~100yds).

For IGC files, you can use:

- these data and maps without the need for Condor to be installed on the computer ;
- LK8000 topographic data (.DEM files)

### Condor

For the Alps, the **AA2.trn** file and the **AA2.bmp** map can be obtained from the **CondorUTill** page:

Download <https://condorutill.fr/VerifLocal/VerifLocalData.zip> and unzip it in the **VerifLocal** installation folder.

This data is of course provided without any guarantee of accuracy of any kind, but, given the number of Condor flights already made over this entire landscape, the accuracy can be considered more than correct.

If Condor is installed on your PC, start **VerifLocal** and click on [**Config./Terrain(IGC)**] in the menu bar and select the file **AA2.trn** which is located in **C:\Condor2\Landscapes\AA2\** (if Condor is installed in **C:\Condor2**). The default map will be automatically selected.

Then click on [**Config./Save config.**] if you want to memorize this configuration.

For other zones, obtain the **.trn** and **.bmp** files of the Condor landscape corresponding to the flight zone and proceed in the same way.

The easiest way is to download the "basic" package of the corresponding Condor landscape from Condor Club: <https://www.condor-club.eu/sceneries/197/>.

For a given landscape, it is always the first one in the list of files to download.

Unzip the file at the desired location. It is then possible to delete all files except:

**LANDSCAPE\_NAME.trn** and **LANDSCAPE\_NAME.bmp**

**Note: take care to use only landscapes intended for Condor version 2** ("C2" must appear before the name of the landscape in the list)

### LK8000

It is possible to use terrain files (.DEM) either existing ones or files generated by the **LKMAPS\_Desktop.exe** application which can be downloaded at the following address:

[http://www.vololiberomontecucco.it/LKMAPS\\_Desktop/LKMAPS\\_Desktop.exe](http://www.vololiberomontecucco.it/LKMAPS_Desktop/LKMAPS_Desktop.exe).

Terrain files for LK8000 are available on their website: <https://www.lk8000.it/download/maps.html>

All resolutions are supported, but display quality will be the best when the DEM file resolution is 3 arcseconds (SRTM3, or 90m ~100yds).

Only maps with relief shading can be displayed at the moment.

### Relief shading maps

These maps are calculated each time.

The sun is at NW (315°), 30° above horizon

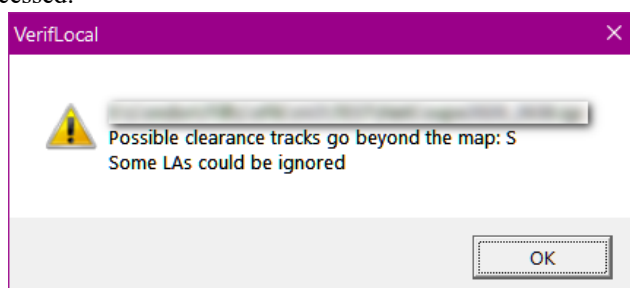
Colours can be modified by editing the **AltCol.txt** file (see below).

### Restrictions

Flights must be contained entirely within the area corresponding to the topography file.

If they straddle two landscapes, they cannot be processed.

If a flight takes place close to the limits of the landscape, the software will not take into account LAs that are off the map but which could theoretically be reached (given the maximum altitude of the flight). This message will be displayed:



## .CUP FILES

These files are specific to each zone and must be provided by the user.

They are in SeeYou format: <http://download.naviter.com/docs/CUP-file-format-description.pdf>

It is not recommended to use the Condor landscape .cup files because they do not generally contain Landing Areas and the quality of the data is very variable.

Only the LAs (airfields or fields) are taken into account. Duplicates are eliminated. Latitude and longitude are used; the elevation will be that of the ground at the point considered (to ensure consistency of calculations).

For French Alps it is advised to use the file provided by the FFVP: **GUIDE CHAMPS FFVP 2019.cup**, provided in the distribution.

For the Alps in general, and a little beyond, the AAPCA (Fayence) has put a very exhaustive file online: <https://www.aapca.net/venir-voler-a-fayence/carte-vac/>

It is up to the user to check that the information used is up to date.

### *CUP format extension*

It is possible to add indications of difficulty in the **description** field.

This indication must appear at the end, between braces {}. Values recognized are:

{A}	Aerodrome	level 0
{F} or {E}	Easy field	level 1 (dark green square)
{ZA} or {LA}	Outlanding area	level 1 (dark green square)
{M}	Medium	level 2 (orange point down triangle)
{D}	Difficult	level 3 (red triangle)
{TD} or {VD}	Very Difficult	level 4 (black diamond)

For example:

```
"FAURIE LA",FAURIZ,FR, [...] ,"FAURIE LA 1 Bleu 310 (Page134) {TD}", ,
```

The FFVV file thus modified is also provided and is named: **GUIDE CHAMPS FFVVdescr.cup**

### *Checking elevations*

For "real life" use, it is possible to use the program to systematically check the elevation of the Landing Areas defined in the files (see **ADVANCED USE** below).

## AVANCED USE

### Batch mode

If a large number of files are to be processed (for example for competitions), it is possible to make a pre-selection by running **VerifLocal** in batch mode. No display will be made and a summary will be written to a CSV file, which can be used in a spreadsheet (Excel or other). To do this, simply run the executable **VerifLocalBatch.exe** (in interactive mode or from a command window) or **VerifLocal.exe** with the **-B** option from a command window (see below).

The data available in the .csv file are :

File	filename
,% out of gl. range	percentage of time spent out of gliding range
time out	time spent out of gliding range
flight time	total flight time
dH ave	average value of altitude needed to remain within gliding range (Mis. on the barogram)
dH max	maximum value of the altitude needed to remain within gliding range (Mis. on the barogram)
Glider	glider name, if available
L/D	working L/D
dH Arr.	safety height on arrival at the LA
dH Gnd	minimum height above ground
time < HHH m AGL	time below HHH m above ground level
% in AS	percentage of cumulative time spent within Airspace zones
time in AS.	cumulated time spent inside the Airspace zones

### Command line

It is possible to launch the program from a command window or from a script.

The syntax (same for **VerifLocalBatch**) is:

```
> VerifLocal [-help] [-B] [-d|-D] [-EN|-FR] [-f:GR] [-chk] [-geojson] [file]
    -help          displays the list of options
    -B             activate batch mode (same as running VerifLocalBatch) see below
    -d             debugging
    -D             very verbose debugging
    -EN            forces the use of English
    -FR            forces the use of French
    -AS            activates airspace verification
    -f:GR          defines the Gliding Ratio used for calculations
    -chk           checks the elevations in the .cup file(s)
    -geojson       generates a .geojson file with the tracks
    file           name of the file to be processed (.igc or .ftr)

> VerifLocalBatch [-help] [-d|-D] [-EN|-FR] [-f:GR] [report] [file(s)]
    report         summary file name (.csv), will be requested if missing
    file(s)        name(s) of the files to be processed (.igc or .ftr, it is
possible to use the usual characters * and ?, e.g.: PATH\FILE_*.igc), will be
requested if missing (max 25 if interactive input)
```

### Checking CUP file elevations

If the **-chk** option is activated, no flight recording will be processed and the software will compare the elevations of the LAs contained in the **.cup** file(s) with the ground elevation defined in the **.trn** file.

If the difference is more than +/- 50m (~160ft), the name of the LA and the corresponding elevations will be written in a file named **NAME.csv** (if the file is named **NAME.cup**).

## ESCAPE ROUTE SEARCHING ALGORITHM

If the starting point of the escape route is below the safety height above the terrain, the glider will first try to deviate from the terrain along the line of greatest slope to pass over this height again.



Then the escape routes will be sought towards all the theoretically reachable LAs (difference in altitude greater than or equal to the distance divided by the glide ratio).

These escape routes will be searched for in the following order:

### *In a straight line*

The trajectory is followed in a straight line from the starting point (shifted if necessary, see above) to the target point, checking the height above ground every 90m (usual horizontal resolution of altimetry data). If one remains permanently above the safety height above ground (for escape routes) and arrives above the minimum height at the finish, the search is over, the trajectory is stored and one moves on to the next LA.

### *Otherwise:*

In a broken line along the slopes

The trajectory is followed in a straight line from the starting point (shifted if necessary, see above) in the direction of the target point, until it passes below the safety height above the ground. Then we will deviate from the relief along the line of greatest slope to pass above this height again.

Then one follows the contour lines in the direction of the target point (do not go backwards). One periodically tests the possibility of reaching the target point in a straight line, as above. If it is possible (by respecting the above criteria), the search is over, one stores the trajectory (after simplification: elimination of points that cause unnecessary detours) and moves on to the next LA.

Otherwise, if the target point is still theoretically reachable and one can start again in a straight line in its direction, one simplifies the recorded trajectory and advances to the next slope and starts again.

### *Otherwise, if the algorithm gets stuck:*

In a broken line following the slope then the valley floor (talweg)

This algorithm is based on heuristic methods for determining watersheds<sup>1</sup> and on an aphorism by the late Roger Biagi: "The glider glide ratio is greater than the one of mountain, so if you can no longer climb, you go down the stairs, rubbing your bottom on all the steps" (heard during a "mountain safety" briefing in Aspres-sur-Büech in the early 1980s and quoted from memory).

One looks for the lowest grid point in the immediate vicinity of the starting point and then move to the lowest neighbouring grid point (first, then second or even third neighbour in the case of a local minimum). The possibility of reaching the target point in a straight line, as above, is periodically tested. If it is possible (respecting the above criteria), the search is over, one stores the trajectory (after simplification) and moves on to the next LA;

Otherwise, one continues to descend, periodically simplifying the trajectory. One will stop if the target point is no longer theoretically reachable or if one gets stuck in a basin, in which case one gives up and move on to the next DZ.

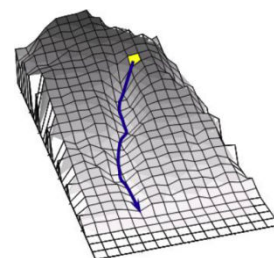


Image taken from the  
ATHYS documentation

Note that this algorithm does not allow to fly uphill do cross a pass, unlike the previous one.

### *Selection of the escape routes found*

The choice of the escape route displayed will be made according to the criteria shown on page 3.

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<sup>1</sup> <http://www.athys-soft.org/documentation>

## Optimization

In the case of long flights at high altitudes, a large number of LAs may be theoretically accessible, which can significantly increase the calculation time.

To avoid this, an optimisation algorithm is activated automatically (only for these cases): the list of LAs is periodically sorted by increasing distance.

This can modify the selection of clearances but does not call into question whether or not the glider remains within gliding range.

In the event of a problem, this optimisation can be deactivated by setting **Optimise=0** in the **VerifLocal.ini** file.

## SUPPORT

Please report any problems to: [cotaco@marc-till.com](mailto:cotaco@marc-till.com)

## ACKNOWLEDGEMENTS

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- Jean-François Gombault who gave the initial idea and showed me the watershed algorithm,
- Yannick Burgevin for the numerous tests he performed as well as for the precious advice he gave for the development of the GUI and the writing of the documentation.
- Jean-Marc Savoie for the tests and the classification by difficulty of the LAs

The graphical interface uses components of "tiny file dialogs" under a zlib license.  
<https://sourceforge.net/projects/tinyfiledialogs/>

The Cpw library is Open Source software, under the Lua license  
<https://mathies.com/cpw/about.html>.

The NaviCon.dll library is provided courtesy of UBSOft, publisher of Condor, which retains copyright.

The conversion of image files is done with NConvert from XnSoft: <https://www.xnview.com/en/nconvert/>  
Please refer to the license.txt file in the NConvert folder.

The topographic data and the map of the Alpine Arc are provided courtesy of Dgtfer, creator of the Arc Alpin 2 (AA2) Condor landscape.

## DISCLAIMER

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## APPENDIX 1: VerifLocal.Ini sample file

```
# Paramètres pour la vérification du respect du local des Zones Atterissable
# les lignes vides ou commençant par # ne sont pas prises en compte
# en l'absence de valeurs, on utilisera la valeur par défaut (def=)

# Parameters for landable zones reachabililty check
# blank lines or beginning by # are ignored
# if no value specified, the default value (def=) will be used

# Taille de la fenêtre (def=1/2 taille de l'écran dans chaque direction)
# Window size (def=1/2 screen size in each direction)
# X-pixels x Y-pixels : e.g. 1024x768
Window Size=

# Affichage : 1=carte, 2=baro, 3=les deux
# Display map : 1=map, 2=barogram, 3=both
# def=3
Display_map=3

# vérification toutes les ...
# check every ...
# sec., [1-120], def=20
Time_step=20

# calcul des trajectoires de dégagement toutes les ... vérifications
# compute clearance tracks every ... checks
# def=2
Paths_frequency=2

# affichage des trajectoires de dégagement
# display clearance tracks
# [0/1], def=0
Show_paths=

# affichage des ZA et espace aériens inatteignables
# display unreachable LAs and airspace
# [0/1], def=0
Show_unreachable=0

# Hauteur de sécurité à l'arrivée
# Safety height at arrival
# metres, >0, def=300
Safety_height=300

# Hauteur minimale au dessus du sol pendant les dégagements
# Minimum height above ground during flights towards landing areas
# metres, >50, def=150
Ground_clearance=150

# Hauteur minimale au dessus du sol pendant le vol (pas testé si 0)
# Minimum height above ground during flight (not tested if 0)
# metres, >= 0, def=200
Min_AGL_height=200

# Finesse de travail
# Working L/D
# [5-99], def=20
Working_L/D=25

# Finesse déterminée en fonction du type de planeur (Condor)
# Working L/D determined according to glider type(Condor)
# [0/1], def=0
Auto L/D=0

# Coefficient de sécurité sur la finesse lue dans le fichier (Condor seulement)
# L/D safety factor when read in file (Condor only)
# %, [10-100], def=50
L/D_Sfty_Fact=50
```

```

# Sélection des ZA
# Fichier OU liste des niveaux de difficulté (0/1) séparée par des virgules, 5 valeurs
# p.ex. : LA_select=1,1,0,0,0 : aérodromes et champs faciles
# LA selection
# Filename OR comma separated list of difficulty levels (0/1), 5 values (from 0 to 4)
# e.g.: LA_select=1,1,0,0,0 : airports and easy outlandings
LA_select=1,1,0,0,0

# Fichier de données topographiques (uniquement pour fichiers IGC)
# Topographic data file (only for IGC files)
TrnFile=%INST%\AA2.trn

# Carte (uniquement pour fichiers IGC)
# Map (only for IGC files)
# MapFile=D:\Condor2\Landscapes\SouthernNorway4\SouthernNorway4.bmp
MapFile=%INST%\AA2.bmp

# Fichier(s) de Zones Atterissables (format .cup SeeYou, maxi 10 fichier)
# Landable Zones file(s) (SeeYou .cup format, 10 files max)
CupFile=%INST%\GUIDE CHAMPS FFVVdescr.cup

# Fichier d'espace aérien (.txt, format OpenAir)
# Airspace file (.txt, OpenAir format)
AirspaceFile=%INST%\France_20-04.txt

# Vérification de l'espace aérien
# Check airspace
# [0/1], def=0
Check Airspace=0

# Affichage de l'espace aérien (0=non, 1=tout, 2=seulement les zones pénétrées)
# Show airspace (0=no, 1=All, 2=only zones penetrated)
# def=0
Show Airspace=0

# Classes d'espace aérien actives ; liste séparée par des virgules ou ALL(toutes)
# Active Airspace Classes ; comma separated list or ALL
# example : A,D,R,CTR
Active Airspace Classes=ALL

# Path to Condor installation folder (if registry cannot be read)
# Chemin d'accès au dossier d'installation de Condor (si le registre ne peut être lu)
Condor 2 path=D:\Condor2

# Optimisation des "gros" fichiers
# "Large" file optimisation
# [0/1], def=1
Optimise=

```



## APPENDIX 2: AltCol.txt file templates

The first line indicates the color reference frame used: [HVC] or [RGB]

Colors can be defined by triplets:

- RGB: [0-255,0-255,0-255]

- HVC (Hue, Value, Chroma ~ Saturation) [0-360,0-100,0-100]

On each line, the maximum altitude of the slice (in m) and the corresponding colour triplet

HVC sample:

```
[HVC]
  0 280 81 27
 250 240 50 50
 500 230 60 50
 750 220 70 50
1000 210 80 50
1250 202 50 40
1500 194 60 40
1750 186 70 40
2000 178 80 40
2250 172 50 20
2500 166 60 20
2750 158 70 20
3000 150 80 20
3250 142 50 15
3500 136 70 5
4000 0 94 0
4500 0 97 0
5000 0 100 0
```

RGB sample:

```
20000 0 100 0

[RGB]
  0 128 242 230
 250 192 255 128
 500 162 225 98
 750 132 195 68
1000 102 165 38
1250 255 225 155
1500 225 195 125
1750 195 175 95
2000 165 145 65
2250 160 130 80
2500 182 162 121
2750 200 190 155
3000 226 216 196
5000 255 255 255
20000 255 255 255
```