

Allanav v 3.2 simulation of GPS-program

The purpose of this simulator program is to make evaluation possible before the real navigation program is downloaded. Although the real program also may be downloaded for free, preliminary evaluation is easier with a PC.

Start of the simulator

Simply double-click the file Simulator-PC.exe. A screen like the one to the right should appear. The program makes use of a limited synthetic vision.

At the top, you have the blue sky.

Below the horizon, the ground (pale green) covers most of the screen.

Objects are positioned as they should be as viewed through the wind screen of the aircraft.

Red color means danger of some kind.

An obstacle close to ESGI extends above the horizon. So it is higher than your present altitude. Collision hazard!

Another obstacle below 'O' in LACKO is lower than your present altitude. The red color means that its top is less than 250 feet below your own altitude.

Up to the left, Sätenäs CTR is drawn with red lines, meaning that at present altitude, you have to get clearance to enter.

Göteborgs TMA (sector Sätenäs) is drawn with blue lines, meaning that you will pass below at your present altitude.

Above 'G' in ESGI, a vertical darkgreen line starts. It tells you position in five minutes at present track and ground speed. The line ends at ten minutes. Next line shows 15-20 minutes, and above that, there is a short line showing 25-30 minutes (just to the left of 'O' in LACKO).

At the lower corners, data on present status are shown. Knowing the position at once is good in case of an emergency.

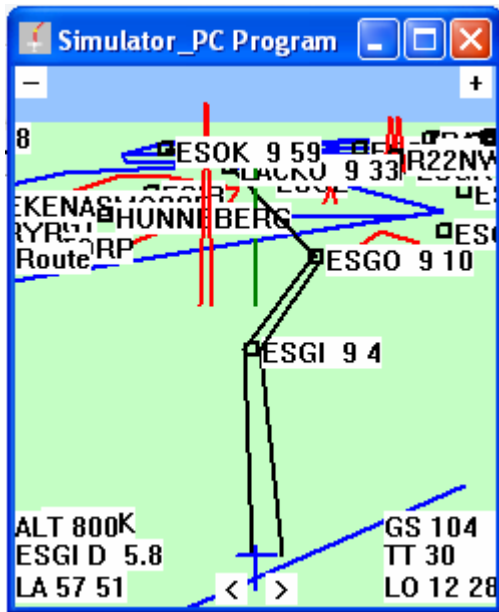
The aircraft symbol is green, meaning that GPS signal is OK. It turns red at unreliable position data. Finally, the screen resolution is shown to the left below the horizon. 8 means that the screen width is 8 nm at the bottom.

Controls

The buttons [**<**] and [**>**] (bottom of screen) can be used to turn left and right respectively. To change resolution, use the buttons at the upper corners. Zoom in with [**+**] and zoom out with [**-**].



Road in the air



At the left edge, slightly above the mid point, there is a button labeled 'Route'. If you press that, you may load a route into the program.

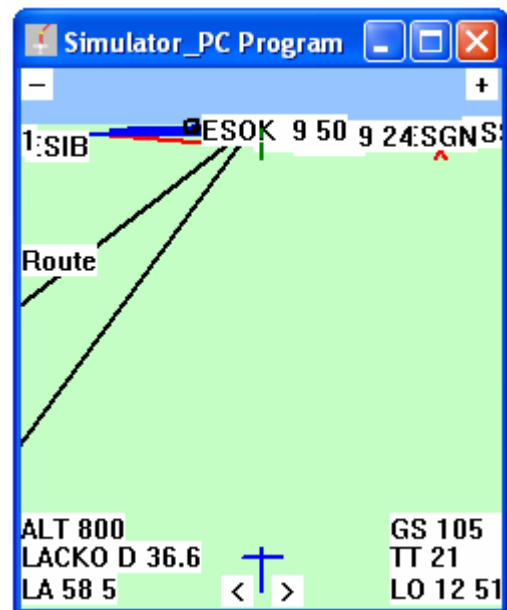
Choosing ESGG-ESOK.txt, you get a screen looking like the picture to the left.

The two closest legs are drawn like a road. The width is 0.5 nm. Thus, you get an idea of scale at different parts of the picture. If you keep to right, particularly close to reporting points, the collision probability is decreased considerably.

At the bottom left, the distance to next waypoint is given. May be of use for communication with ATC.

Sometimes, one might need a better overview, which may be accomplished by zoom out.

The screen is updated every four seconds. This is more seldom than common in GPS programs. I have tested this in flight competitions (e.g. The International Malta Air Rally), and in training for such, finding that the better accuracy given by a larger interval is beneficial. 4-5 seconds appear to be optimal. Similarly, one sometimes needs high lateral resolution. Then, zooming in gives the desired property. In common GPS programs, it may be difficult to follow the track at high resolution. It simply goes away from the screen. This is no problem with the Allanav program. In the right hand picture, the screen width means 1.0 nm. Thus, one mm is equivalent to merely 30 m. Although, the flight is far to the right of the track, returning is easy.



Log book and flight log

When the speed exceeds 30 knots during more than ten seconds, the the flight is considered to be airborne and the time is noted into the log book file (logbook.txt). Similarly landing is assumed when the speed is less than 20 knots during ten seconds.

Every ten seconds, the real program writes flight data into a file (raw data from the GPS unit). This function is not active in the simulator program.

The real Allanav program

After you have been running the simulator in your PC, I hope to have convinced you that downloading the real program is worthwhile. You may download it for free, and there is no expiration date for the program. If you find it usable, I appreciate that you pay a (voluntary) licence fee. This will help me improve and develop the program and its data bases.

APPENDIX Data files

All data files are written as plain text, so the user is able to read and edit according to needs. Each object (waypoint, airspace sector etc) is written as a single line. Items are separated (blank space and TAB are recognized).

Coordinates are given as degrees.decimals. Negative values mean south and west respectively. The program is case sensitive, so I recommend upper case for names. Examples and explanations are given below.

All fields are required, except when stated to be optional.

Waypoints

The current version of the program can handle 1000 waypoints. This number will have to be increased in later versions. The waypoints may be given in any order irrespective of type.

Example

ESGO	58.0422	12.7900	A	123.65
NAME	Latitude	Longitude	Type	Info

In the example above, the type is airport, and the optional info is frequency. The following types are recognized by the Allnav program:

A	Airport	Info is optional frequency
E	Entry point	Info is optional
N	NDB	Info is optional frequency
O	Obstacle	Info is compulsory height (MSL)
R	Reporting point	Info is optional frequency
U	User point	Info is optional
V	VOR	Info is optional frequency

A name may contain up to 19 characters.

Lines starting with the # character are ignored (comment lines)

File name: waypoints.txt

Airspace

The current version of the program can handle up to 200 sectors of airspace. This number will have to be increased in later program versions. Each sector may have up to 25 corners.

Circular sectors are approximated as polygons.

Example

	Info	Lower limit								
Oskarshamn	TIZ *	122.15	G 0	1000	57.4233	16.4644	57.4169	16.5633	57.2822	16.5339
Name	Type	Freq	Class	Upper limit	Coordinates of corners					

The star is used to give nonsense information into a compulsory field, meant for call sign etc.

Lines starting with the # character are ignored (comment lines)

Limitations: The fields for name and info may consist of up to 19 characters

File name: zones.txt

Port

The program is connected to the GPS unit via a serial port (typically Blue Tooth). The port settings are given in this file. Available options are described in separate lines followed by the actual value. All lines have to be present and order must not be changed.

In the simulator program, this file is a dummy.

Example

```
Comm Port 0 1 2 3 4 5 6 7 8
6
Speed 1200 2400 4800 9600 19200 38400 57600 115200
38400
Parity 0-4 = no, odd, even, mark, space
0
Data bits 4-8
8
#Stop Bits 0=1 1=1.5 2=2
0
```

File name: port.txt

Logbook

Start and landing times are given like this:

```
.....
Start 11.53
Landing 13.24
```

File name: logbook.txt

Flight log

Data on the flight is written every ten seconds. This may be a rather big file, that can be useful for handling incidents, like accused airspace intrusion. This file is not produced by the simulator. An example of the usefulness is given here: <http://www.nuchem.se/allan/EHWO-08.htm>

File name: raw-data.txt

Routes

The content of a route file is simply a list of waypoint names. The names are case sensitive. A route may contain up to 100 waypoints. The file should be a .txt file, and a descriptive file name is recommended.

Simulation control

This file gives information on initial values for the simulation. The file should be self explaining. All lines are required. For obvious reasons, there is no such file in the real Allanav program.

File name: simul.txt