

ASTRONAVIGATION

Quick Help

AstroNavigation - Windows

The screenshot displays the AstroNavigation software interface. The main window shows a nautical chart with a sextant and a celestial globe overlaid. The chart includes various geographical features and depth soundings. The sextant is positioned to measure a celestial body, with a circular diagram showing a 109-degree angle. The celestial globe is labeled 'Fig.V' and shows a grid of celestial coordinates. The control panel on the right contains the following information:

- Time of Fix - UT1:** 28/05/2025, 13:17:01. A 'Now UTC' button is present.
- Assumed Position:** B 43° 19.0' N, L 002° 00.0' W.
- Rhumb between observations:** COG 0.0°, SOG 0.0 kt.
- LS calculation:** Max iterations 1, Probability % 95.
- Fix:** 00° 00.0' N, 000° 00.0' W, error = 00.0 nm.
- Buttons:** GPX OUT, Log, Open GPX, CoPs.

Starting ...

1. Enter the data of the sight

2. Sight Reduction

3. Insert Observation

4. Repeat the process with all observations.

The screenshot shows the AstroNavigation software interface with the following data and settings:

Date: 13/06/2025
UT1: 7:16:07

Assumed position:
Latitude: 43° 19.0' N
Longitude: 002° 00.0' W

Observation:
Celestial body: Sun
Altitude Hs: 27° 37.15'
Limb: lower
Reference: Sea horizon
h eye: 3.15 m
IC: 0.0

Atmospheric variables:
Pressure: 1010.0 hPa
Temperature: 10.0 °C

Sight Reduction:
Observed Altitude (true): Marcq St. Hilaire LoP

NAUTICAL ALMANAC:
Sun
GHA = 289.007535 ° = 289° 0.5'
Dec = 23.228167 ° = 23° 13.7'
SD = 15.7497 '
HP = 0.1443 '

ALTITUDE CORRECTION:
Limb: lower
Ref: SeaHorizon
Hs = 27.6192 ° = 27° 37.1'
ic = 0.0000 '
heas = 3.1500 m
T = 10.0 °C
P = 1010.0 hPa
Hoi = 27.6192 °
dip = 0.0521 °
Ha = 27.5671 ° = 27° 34.0'
R = 0.0310 °
OB = -0.00000293 °
HP = 0.0024 °
PA = 0.00212946 °
SD = 0.2625 °
Aug = 0.00000510 °
SDag = 15.74996267 '
Ho = 27.8007 ° = 27° 48.0'

Marcq St. Hilaire LoP:
LHA = 287.007535 ° = 287° 0.5'
Hc = 27.7833 ° = 27° 47.0'
Zn = 83.3 °
p = Ho-Hc = 0.017388 ° = 1.043275 '

Observations Table:

day	month	year	h	m	s	body	Dec	GHA	Ho
13	6	2025	7	16	7	Sun	23.22816...	289.00753...	27.8006977763

Starting ...

The screenshot shows the AstroNavigation software interface with the following components and callouts:

- 5. Set data for Fix:** Callout pointing to the 'Time of Fix' field in the 'Assumed Position' section, which is set to 09/02/2001 12:00:00.
- 6. Save data to a file:** Callout pointing to the 'Save' icon in the 'File' menu.
- 7. Fix:** Callout pointing to the 'Fix' button in the 'Assumed Position' section.
- 8. Output:** Callout pointing to the 'GPX OUT' button in the bottom right corner.

File Menu:

day	month	year	h	m	s	body	Dec	GHA	Ho
9	2	2001	6	58	52	Vega	38.781487	324.918379	49.499319
9	2	2001	7	1	45	Spica	-11.166083	43.565792	38.61458
9	2	2001	7	3	52	Luna	13.462081	87.339437	21.548138
9	2	2001	9	53	45	Sol	-14.587346	324.885309	22.834981

Observations Section:

day	month	year	h	m	s	body	Dec	GHA	Ho
9	2	2001	6	58	52	Vega	38.781487	324.918379	49.499319
9	2	2001	7	1	45	Spica	-11.166083	43.565792	38.61458
9	2	2001	7	3	52	Luna	13.462081	87.339437	21.548138
9	2	2001	9	53	45	Sol	-14.587346	324.885309	22.834981

Assumed Position Section:

Time of Fix: 09/02/2001 12:00:00
Assumed Position:
B 32° 45.0' N
L 015° 30.0' W
COG 315.1 °
SOG 12.2 kt
Max iterations 1
Probability % 95

Observations Section:

File menu: Save, New, Open, Print, etc.

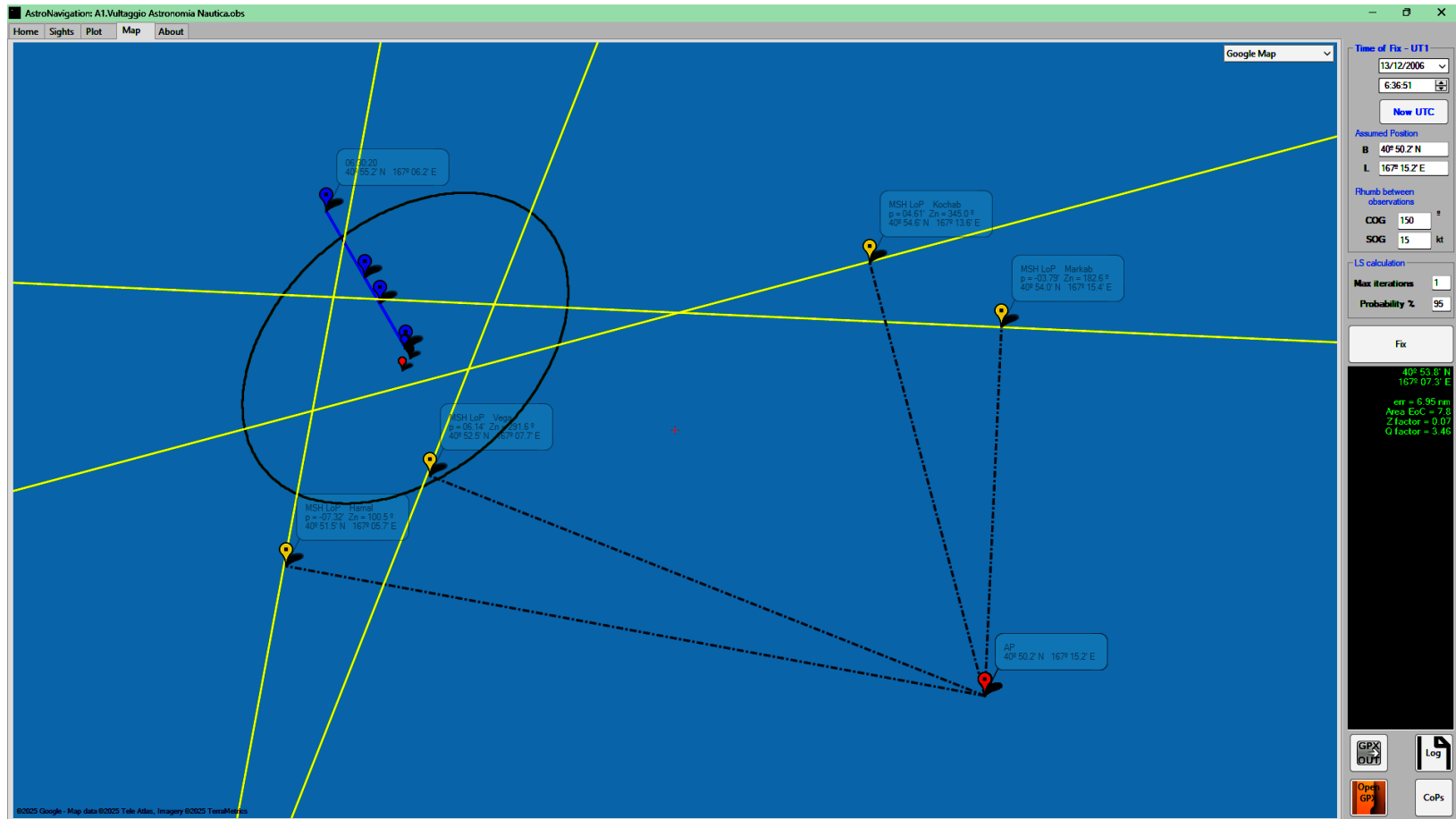
File/Obsevsations - options

The screenshot displays the AstroNavigation software interface. The main window is titled "AstroNavigation: high_altitudes.obs". The interface is divided into several sections:

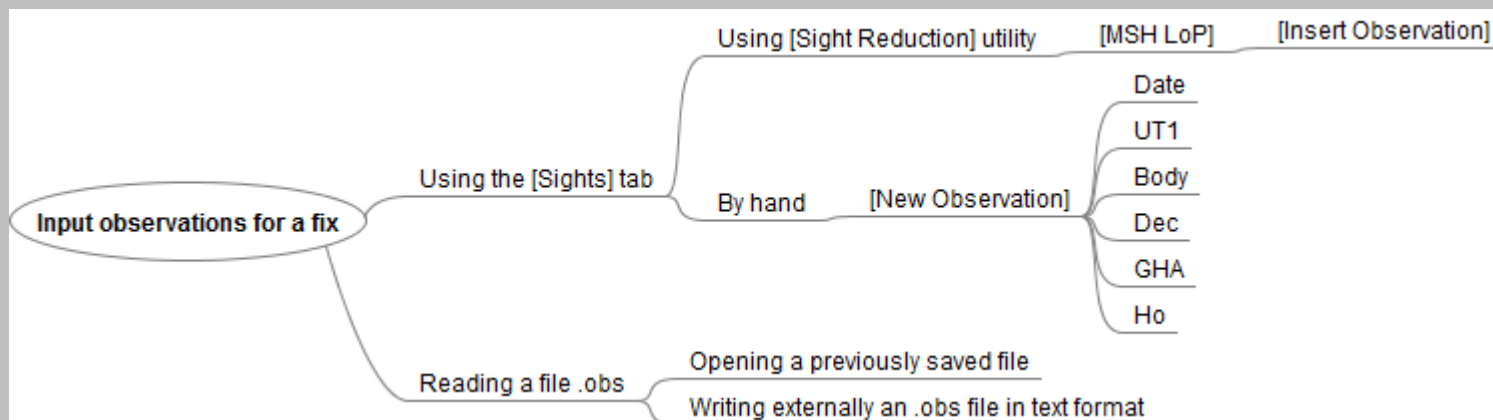
- File:** Contains icons for "Open", "New", and "Save". A green callout bubble points to these icons with the text "File" and a list of options: "• Open", "• New", and "• Save".
- Observations:** Contains icons for "Insert", "New", and "Delete". A green callout bubble points to these icons with the text "Obsevsations" and a list of options: "• Insert", "• New", and "• Delete".
- Table:** A table with columns: day, month, year, h, m, s, body, Dec, GHA, Ho. The data rows are:

day	month	year	h	m	s	body	Dec	GHA	Ho
21	6	2006	22	0	0	Alioth	55.928	46.372	82.943
21	6	2006	22	0	0	Alkaid	49.283	33.002	85.413
- Left Panel:** Contains input fields for Date (13/06/2025), UT1 (7:16:07), Assumed position (Latitude: 43° 19.0' N, Longitude: 002° 00.0' W), Observation (Celestial body: Sun, Altitude Hs: 00° 00.0', Limb: lower, Reference: Sea horizon, h eye: 3.15 m, IC: 0.0), Atmospheric variables (Pressure: 1010.0 hPa, Temperature: 10.0 °C), and Sight Reduction (Observed Altitude (true), Marcq St. Hilaire LoP).
- Right Panel:** Contains Time of Fix - UT1 (21/06/2006, 22:00:00), Assumed Position (B: 48° 00.0' N, L: 040° 00.0' W), Rhumb between observations (COG: 0°, SOG: 0 kt), LS calculation (Max iterations: 1, Probability %: 95), Fix, GPX OUT, Log, Open GPX, and CoPs.

AstroNavigation - Marcq Saint-Hilaire LoPs



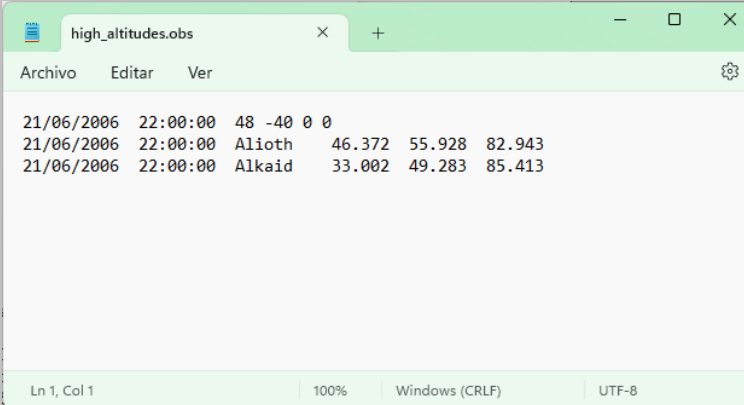
Input observations for a fix



.obs file

The **.obs** file
Can be edited with notepad

.obs						
Date	Fix	tFix	Bap(tFix)	Lap(tFix)	COG	SOG
date		ut1	body	GHA	Dec	Ho
date		ut1	body	GHA	Dec	Ho
date		ut1	body	GHA	Dec	Ho
date		ut1	body	GHA	Dec	Ho



The screenshot shows a Notepad window titled 'high_altitudes.obs'. The window has a menu bar with 'Archivo', 'Editar', and 'Ver'. The main text area contains three lines of data:

```
21/06/2006 22:00:00 48 -40 0 0
21/06/2006 22:00:00 Alioth 46.372 55.928 82.943
21/06/2006 22:00:00 Alkaid 33.002 49.283 85.413
```

The status bar at the bottom indicates 'Ln 1, Col 1', '100%', 'Windows (CRLF)', and 'UTF-8'.

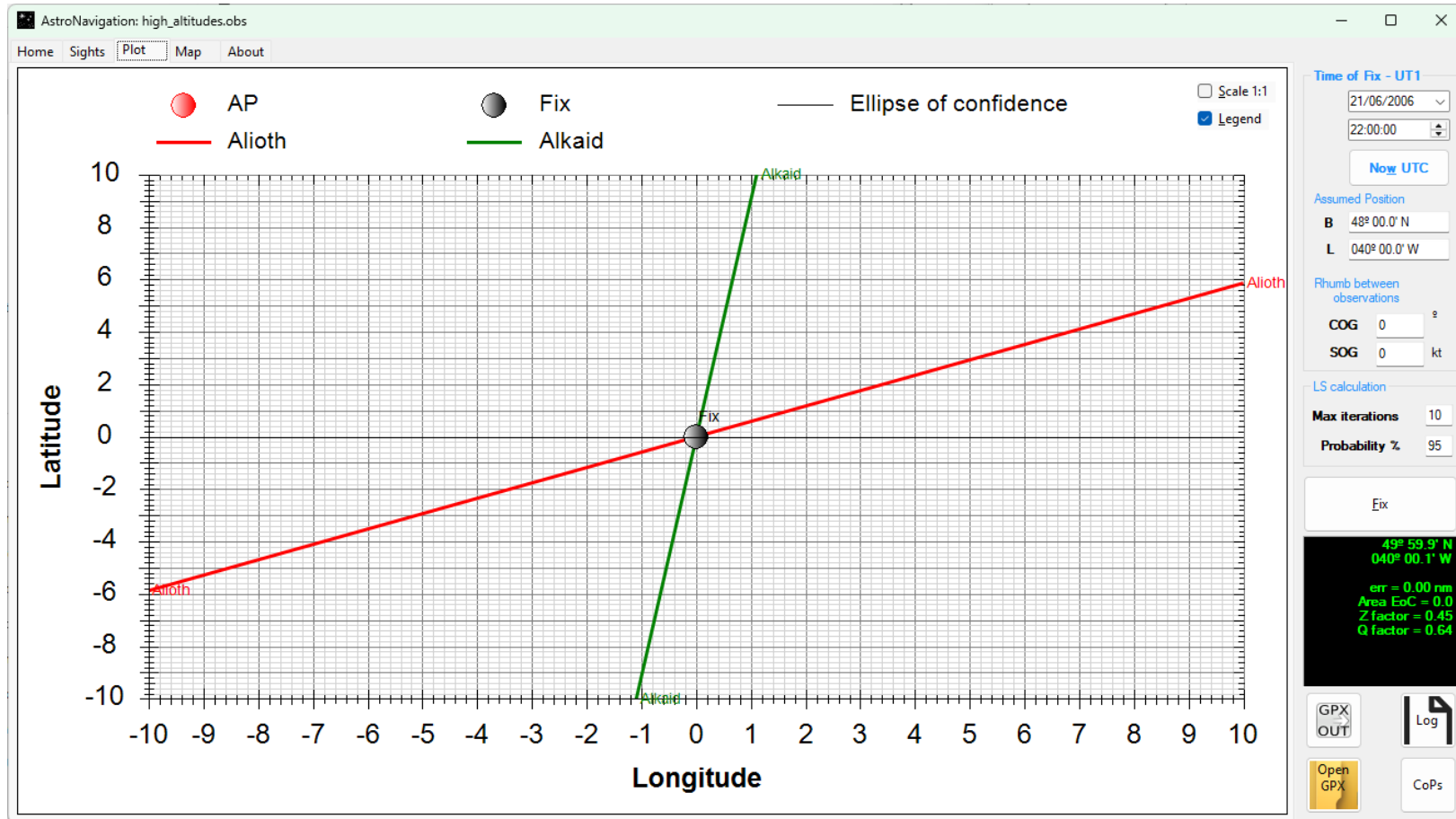
Example – Open File

The screenshot displays the AstroNavigation software interface. The main window title is "AstroNavigation: high_altitudes.obs". The interface is divided into several sections:

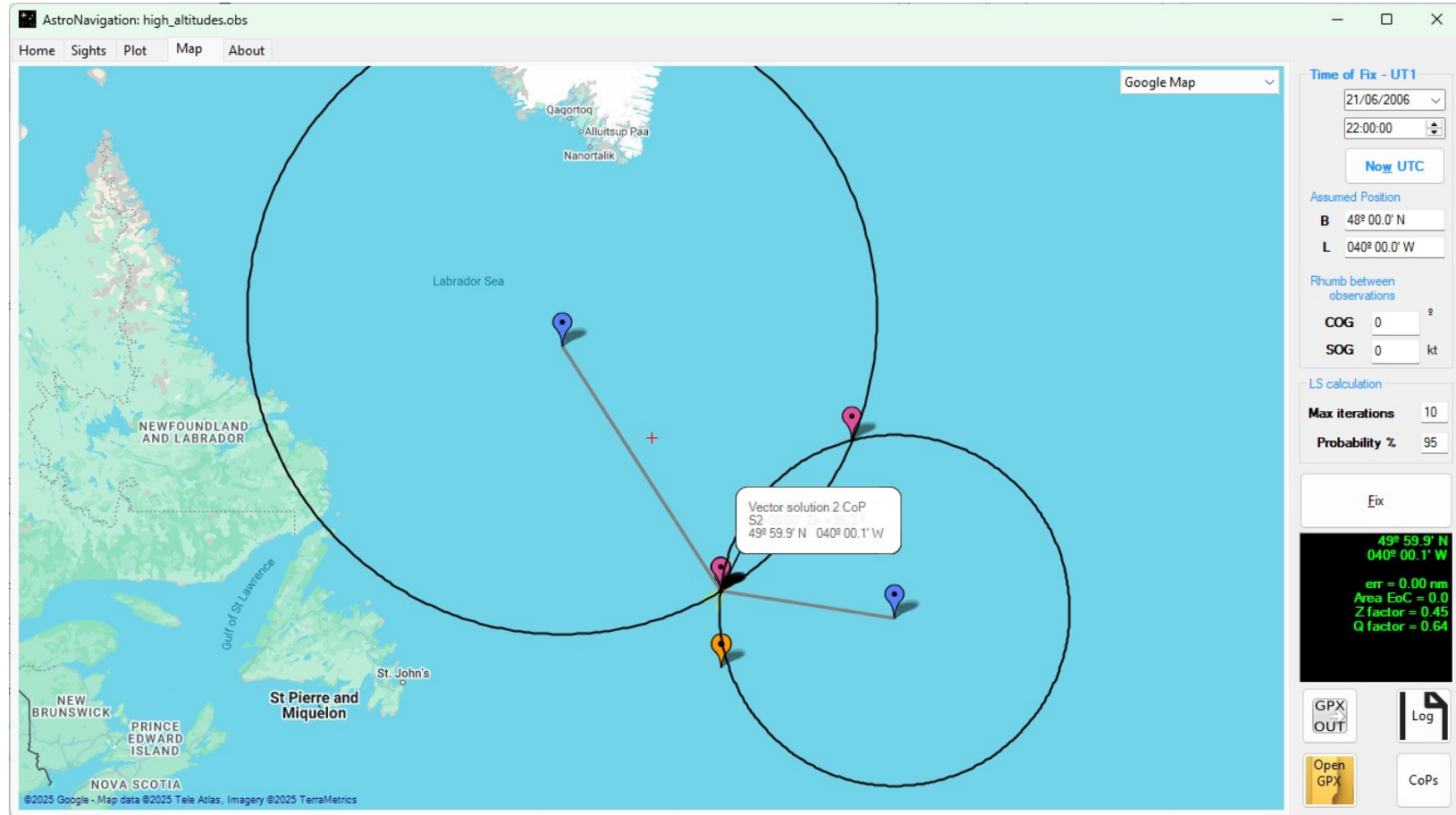
- File:** Contains icons for "New" and "Save".
- Observations:** A table with columns: day, month, year, h, m, s, body, Dec, GHA, Ho. The table contains two rows of data:

day	month	year	h	m	s	body	Dec	GHA	Ho
21	6	2006	22	0	0	Alioth	55.928	46.372	82.943
21	6	2006	22	0	0	Alkaid	49.283	33.002	85.413
- Time of Fix - UT1:** Date: 21/06/2006, Time: 22:00:00. Includes a "Now UTC" button.
- Assumed Position:** B: 48° 00.0' N, L: 040° 00.0' W.
- Rhumb between observations:** COG: 0°, SOG: 0 kt.
- LS calculation:** Max iterations: 1, Probability %: 95.
- Buttons:** "Fix", "GPX OUT", "Log", "Open GPX", "CoPs".
- Left Panel (Parameters):**
 - Date: 13/06/2025, UT1: 7:16:07
 - Assumed position:** Latitude: 43° 19.0' N, Longitude: 002° 00.0' W
 - Observation:** Celestial body: Sun, Altitude Hs: 00° 00.0', Limb: lower, Reference: Sea horizon, h eye: 3.15 m, IC: 0.0
 - Atmospheric variables:** Pressure: 1010.0 hPa, Temperature: 10.0 °C
 - Sight Reduction:** "Observed Altitude (true)", "Marcq St. Hilaire LoP"

Example - Plot



Example - Map



Example - Map

The screenshot displays the AstroNavigation software interface, titled "AstroNavigation: high_altitudes.obs". The main window shows a map of the North Atlantic region, including Greenland, Iceland, and parts of North America and Europe. A GP fix point is marked with a red cross and a tooltip showing coordinates: GP Alioth 55° 55.7' N, 46° 22.3' W. The map also shows several circular regions and lines connecting points, likely representing observation paths or error regions.

The interface includes a menu bar with "Home", "Sights", "Plot", "Map", and "About". A "Google Map" dropdown is visible in the top right corner of the map area.

On the right side, there are several control panels:

- Time of Fix - UT1:** A date selector set to 21/06/2006 and a time selector set to 22:00:00. A "Now UTC" button is present.
- Assumed Position:** Latitude (B) set to 49° 00.0' N and Longitude (L) set to 040° 00.0' W.
- Rhumb between observations:** COG (Course Over Ground) set to 0 and SOG (Speed Over Ground) set to 0 kt.
- LS calculation:** Max iterations set to 10 and Probability % set to 95.
- Fix:** A button to calculate the fix.
- Results:** A black box displaying the calculated fix: 49° 59.9' N, 040° 00.1' W. Below this, it shows: err = 0.00 nm, Area EoC = 0.0, Z factor = 0.45, and Q factor = 0.64.
- GPX OUT:** A button to export the data as GPX.
- Log:** A button to view the log.
- Open GPX:** A button to open a GPX file.
- CoPs:** A button to view CoPs (Circle of Possibilities).

The bottom of the map area shows copyright information: ©2025 Google - Map data ©2025 Tele Atlas, Imagery ©2025 TerraMetrics.

Example – Calculation & Plot options

The screenshot shows the AstroNavigation software interface. The main window displays a map of the North Atlantic Ocean with a plot of celestial observations. A green circle highlights a 'Popup menu' that appears when the mouse right-clicks on the plot. The popup menu contains the following options:

- Set AP
- Plot Options
- Clear
- Zoom
- Terminator

The 'Plot & Calculation options' dialog box is open on the left, showing the following settings:

- at time of sight**
 - Initial LoPs
 - GP & Zn
- at time of fix**
 - CoPs
 - Deformed CoPs
 - MSH
 - Sumner
- Celestial Fix**
 - LS MSH SR
 - Kaplan
 - LS Bisectors SR
- 2 CoPs**
 - Vector solution
 - Van Allen

The right panel displays the 'Time of Fix - UT1' settings and the resulting fix calculation results:

Time of Fix - UT1: 21/06/2006, 22:00:00
Now UTC

Assumed Position:
B 49° 00.0' N
L 040° 00.0' W

Rhumb between observations:
COG 0°
SOG 0 kt

LS calculation:
Max iterations: 10
Probability %: 95

Fix: 49° 59.9' N, 040° 00.1' W
err = 0.00 nm
Area EoC = 0.0
Z factor = 0.45
Q factor = 0.64

Buttons: GPX OUT, Log, Open GPX, CoPs

AstroNavigation – Folders & content

Extract Navigational Algorithms.7z

bin (programs)

Data

- Lunar Distances -2LD Fix
- AstroNavigation
- Magnetic compass - Deviation
- Nautical Astronomy - Meridian passage

Documentation

/Technical notes
README.pdf
Software - Navigational Algorithms.tips.pdf
...

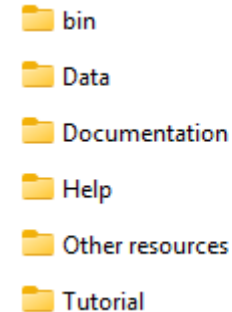
Help

AstroNavigation.Help.pdf
Magnetic compass.html
PlotCoPonMap.html
Tide interpolator.html

Other resources


Tutorial

- Celestial Navigation (Celestial Navigation Example.pdf)
- Coastal Navigation
- Currents
- GC & CS (Great Circle and Composite sailing)
- SAR patterns




AstroNavigation - About

NAVIGATIONAL ALGORITHMS



AstroNavigation
v1999 - 2026
©Andrés Ruiz González
San Sebastián - Donostia
43° 19'N 002°W
<http://sites.google.com/site/navigationalalgorithms/>

 **Help**

[Navigational Algorithms](#)

Warranty disclaimer: Use it at your own risk

Previous parts

Almanaque Nautico.exe	CelestialFix.exe
2001 v1.0	2001 v1.0
2004 v1.1	2007 v2.0
2007 v2.0	2009 v3.0
2009 v2.1	v 2010.07
2010 v2.3 r0906	
PlotHZ.exe	AstroNavigation.exe
2004 v1.0	2011 - 2017

Time of Fix - UT1
18/02/2026
7:27:25
Now UTC

Assumed Position
B 43° 19.0' N
L 002° 00.0' W

Rhumb between observations
COG 0.0 °
SOG 0.0 kt

LS calculation
Max iterations 1
Probability % 95

Fix

00° 00.0' N
000° 00.0' W
error = 00.0 nm

GPX OUT Log
Open GPX CoPs