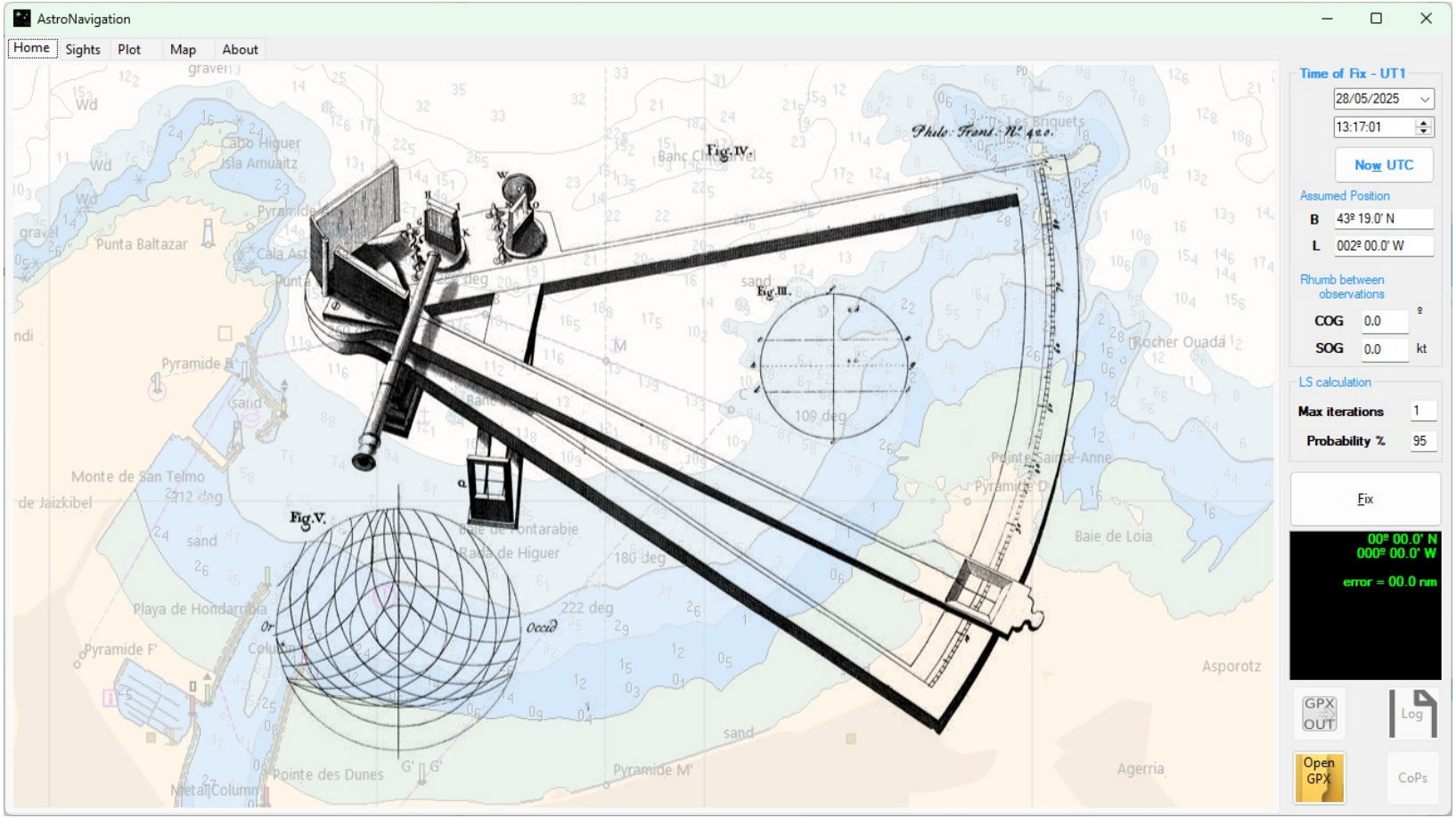
ASTRONAVIGATION

Quick Help

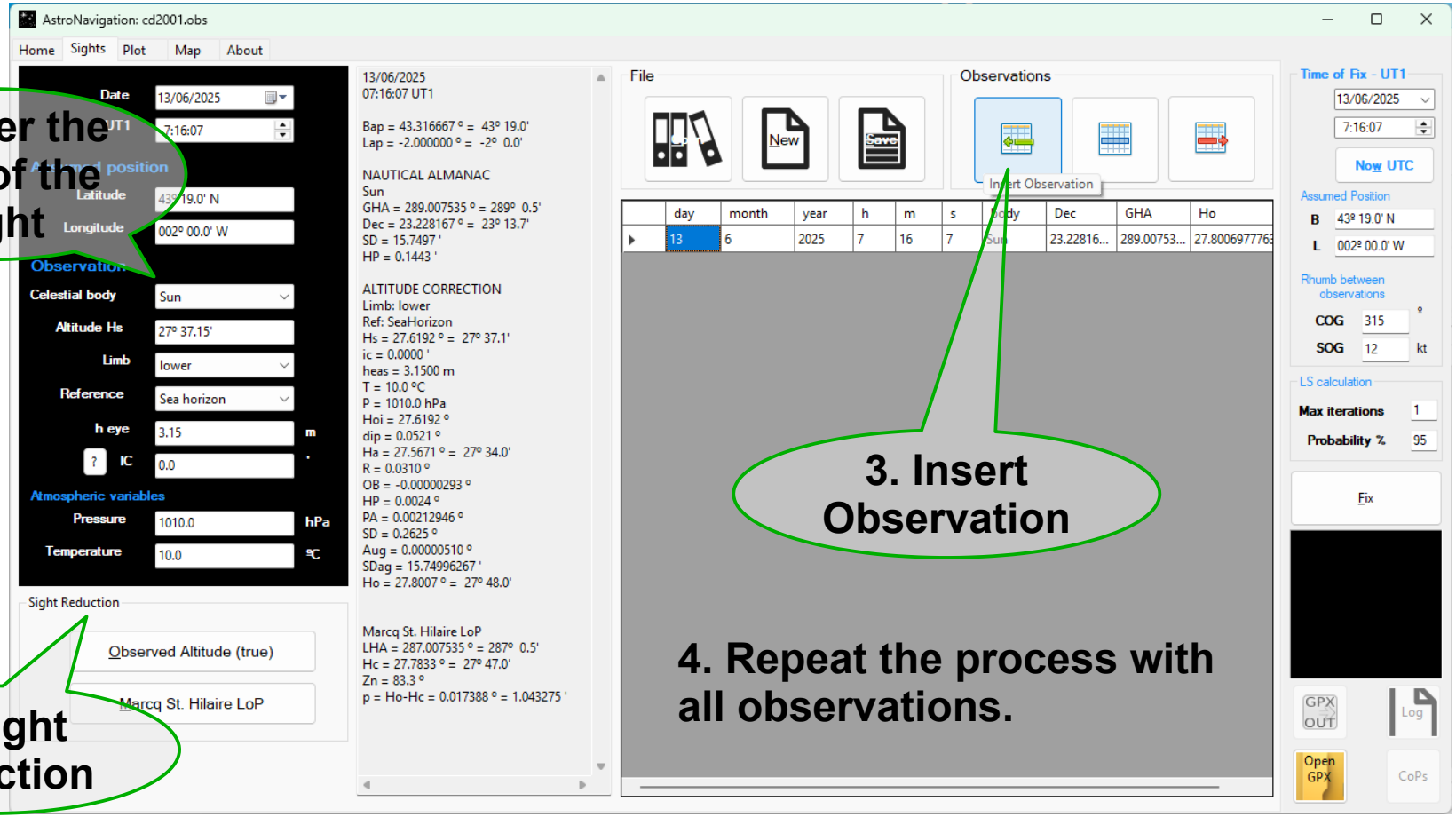
https://sites.google.com/site/navigationalalgorithms/
San Sebastián – Donostia
43º19'N 002ºW

NAVIGATIONAL ALGORITHMS

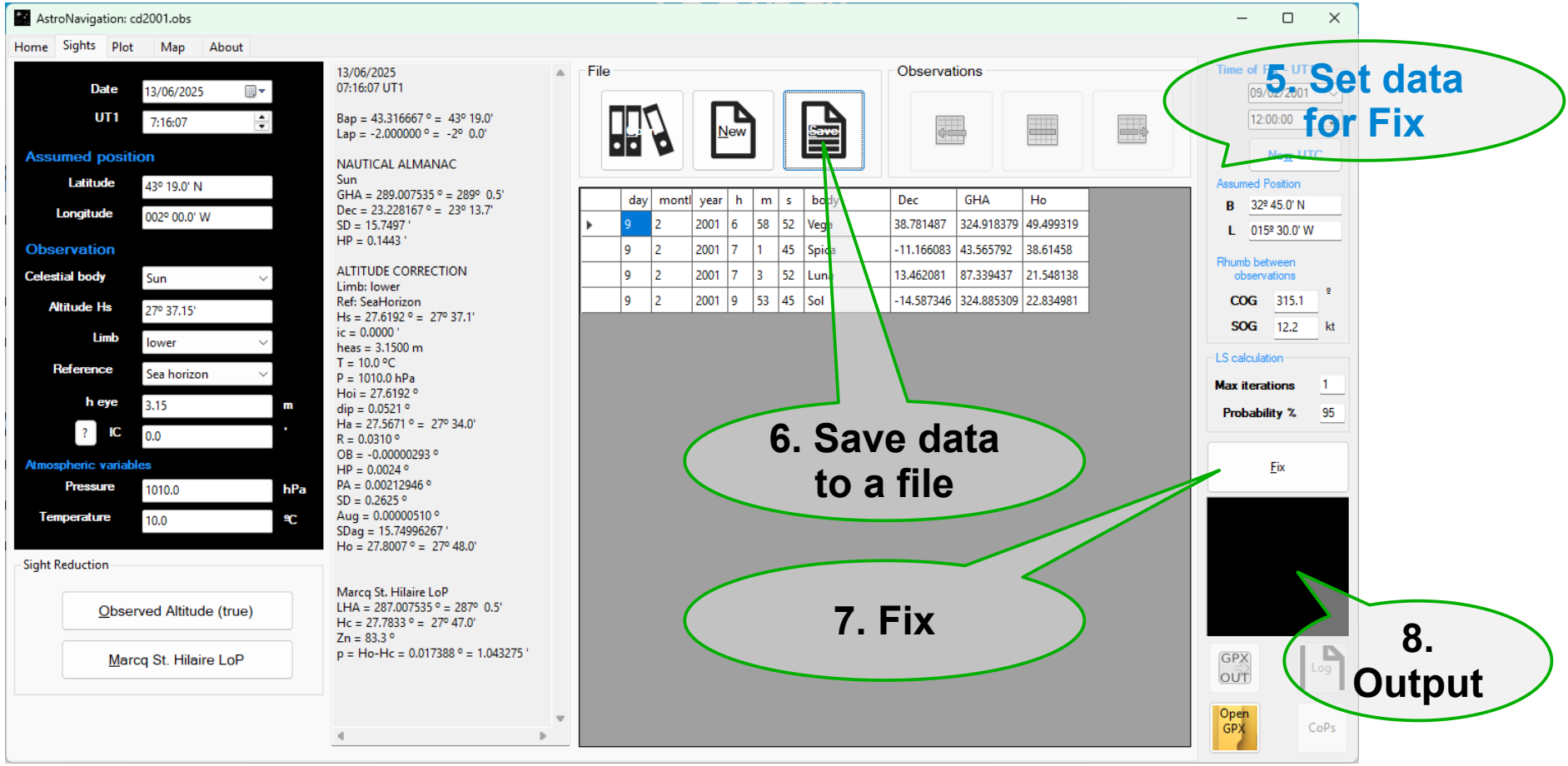
AstroNavigation - Windows



Starting ...


AstroNavigation: cd2001.obs
Home
Sights
Plot
Map
About
Date
13/06/2025
7:16:07
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
13/06/2025
07:16:07 UT1
Bap = 43.316667 ° = 43° 19.0'
Lap = -2.000000 ° = -2° 0.0'
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 '
File
Open
New
Save
Observations
Insert Observation
day
month
year
h
m
s
Body
Dec
GHA
Ho
13
6
2025
7
16
7
Sun
23.22816...
289.00753...
27.8006977763
Time of Fix - UT1
13/06/2025
7:16:07
Now UTC
Assumed Position
B
43° 19.0' N
L
002° 00.0' W
Rhumb between observations
COG
315
SOG
12
kt
LS calculation
Max iterations
1
Probability %
95
Fix
GPX OUT
Log
Open GPX
CoPs
1. Enter the data of the sight
2. Sight Reduction
3. Insert Observation
4. Repeat the process with all observations.

Starting ...


AstroNavigation: cd2001.obs
Home
Sights
Plot
Map
About
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
13/06/2025
07:16:07 UT1
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Lap = -2.000000 ° = -2° 0.0'
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 °
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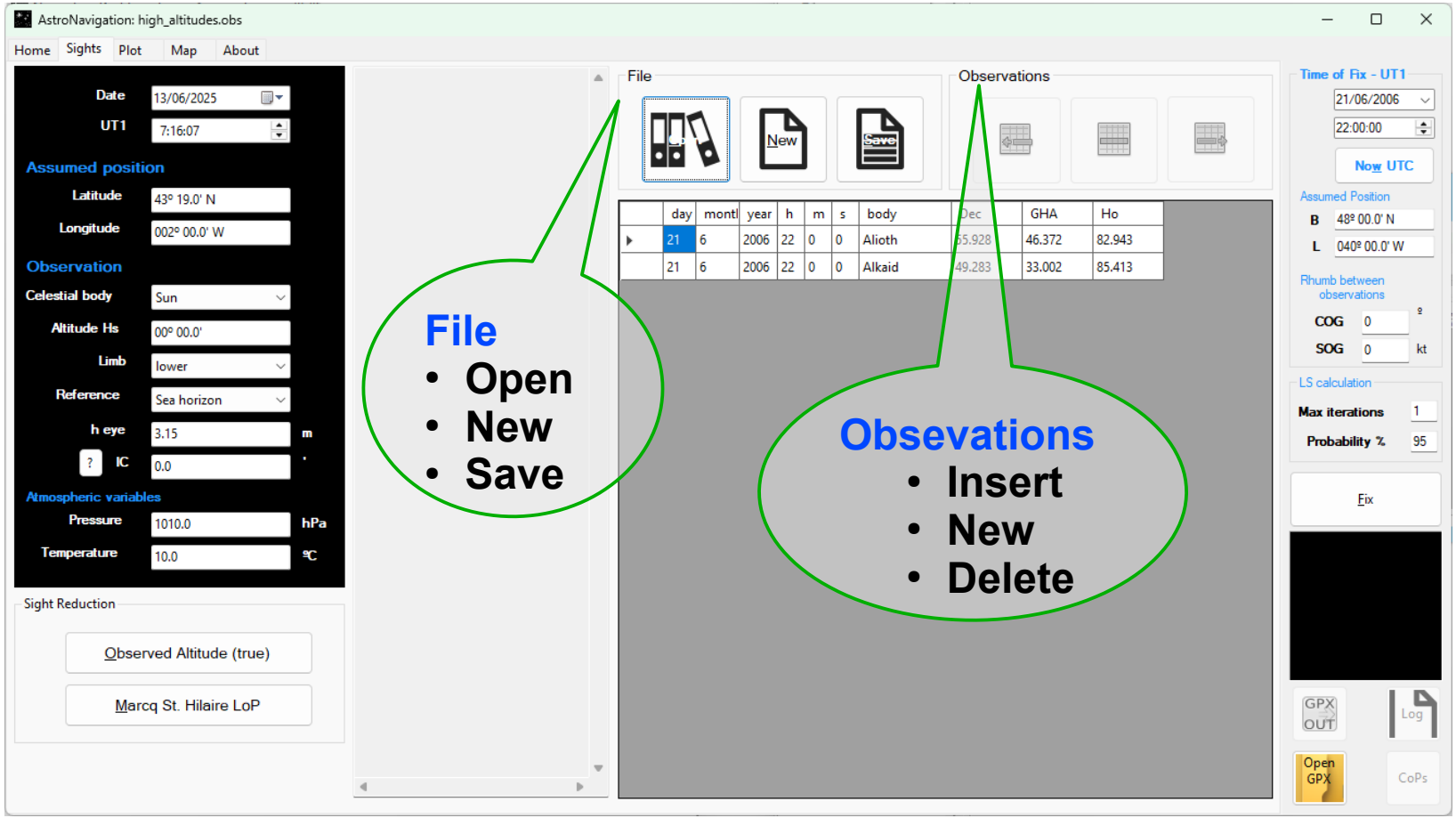
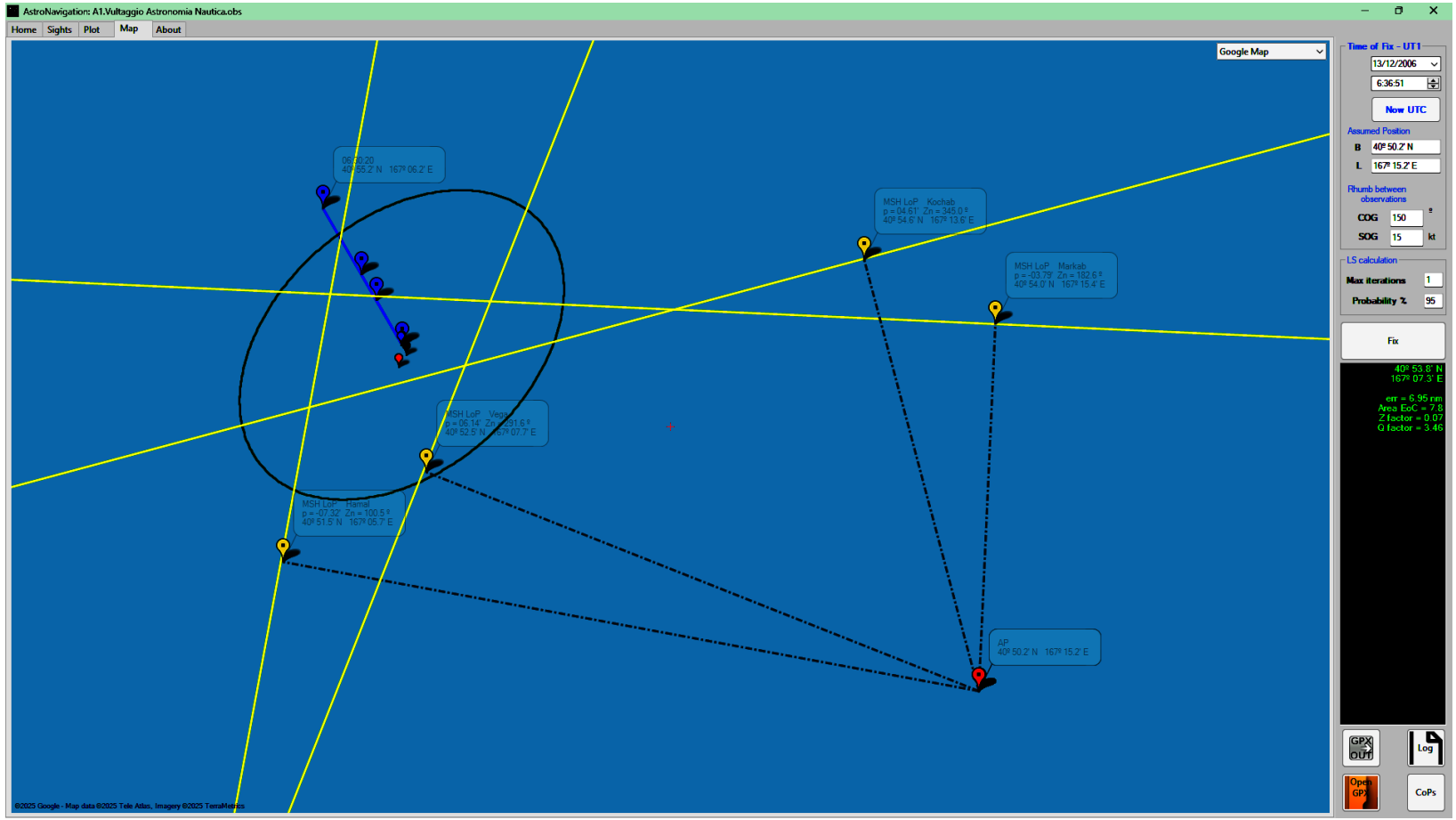
LHA = 287.007535 ° = 287° 0.5'
Hc = 27.7833 ° = 27° 47.0'
Zn = 83.3 °
p = Ho-Hc = 0.017388 ° = 1.043275 '
File
New
Save
Observations
day
month
year
h
m
s
body
Dec
GHA
Ho
9 2 2001 6 58 52 Vega 38.781487 324.918379 49.499319
9 2 2001 7 1 45 Spica -11.166083 43.565792 38.61458
9 2 2001 7 3 52 Luna 13.462081 87.339437 21.548138
9 2 2001 9 53 45 Sol -14.587346 324.885309 22.834981
Assumed Position
B
32° 45.0' N
L
015° 30.0' W
Rhumb between observations
COG
315.1
°
SOG
12.2
kt
LS calculation
Max iterations
1
Probability %
95
Fix
GPX OUT
Log
Open GPX
CoPs
5. Set data for Fix
6. Save data to a file
7. Fix
8. Output

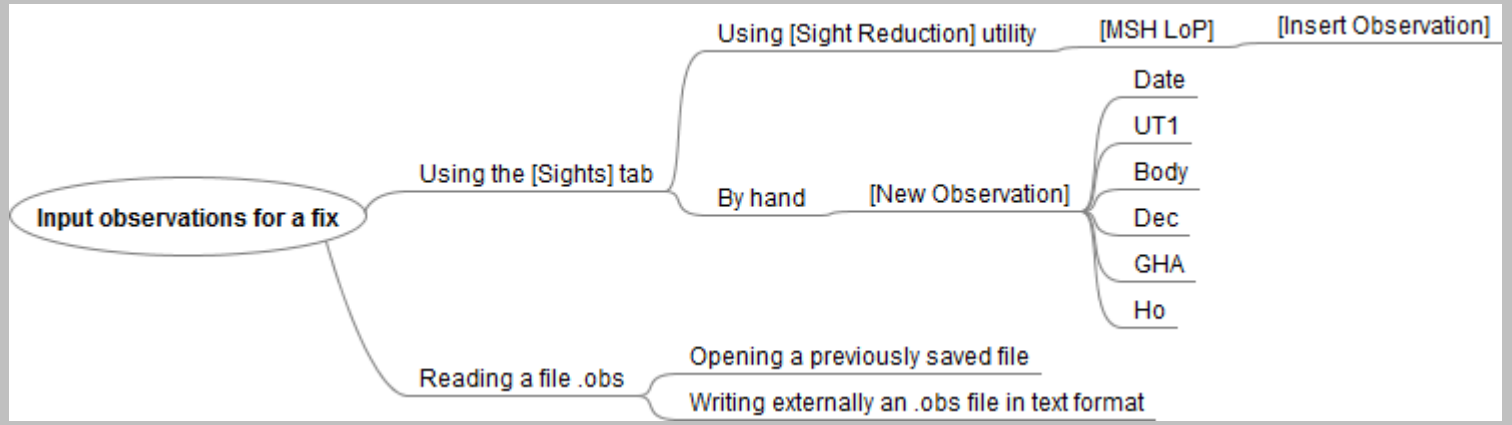
File/Obsevations - options



AstroNavigation - Marcq Saint-Hilaire LoPs



Input observations for a fix



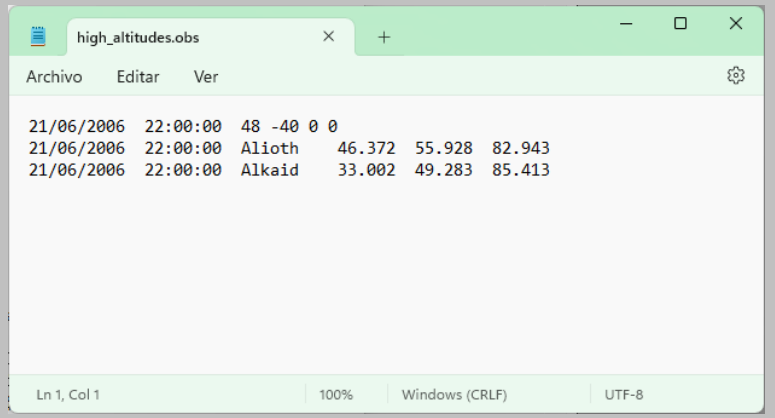
.obs file

The .obs file

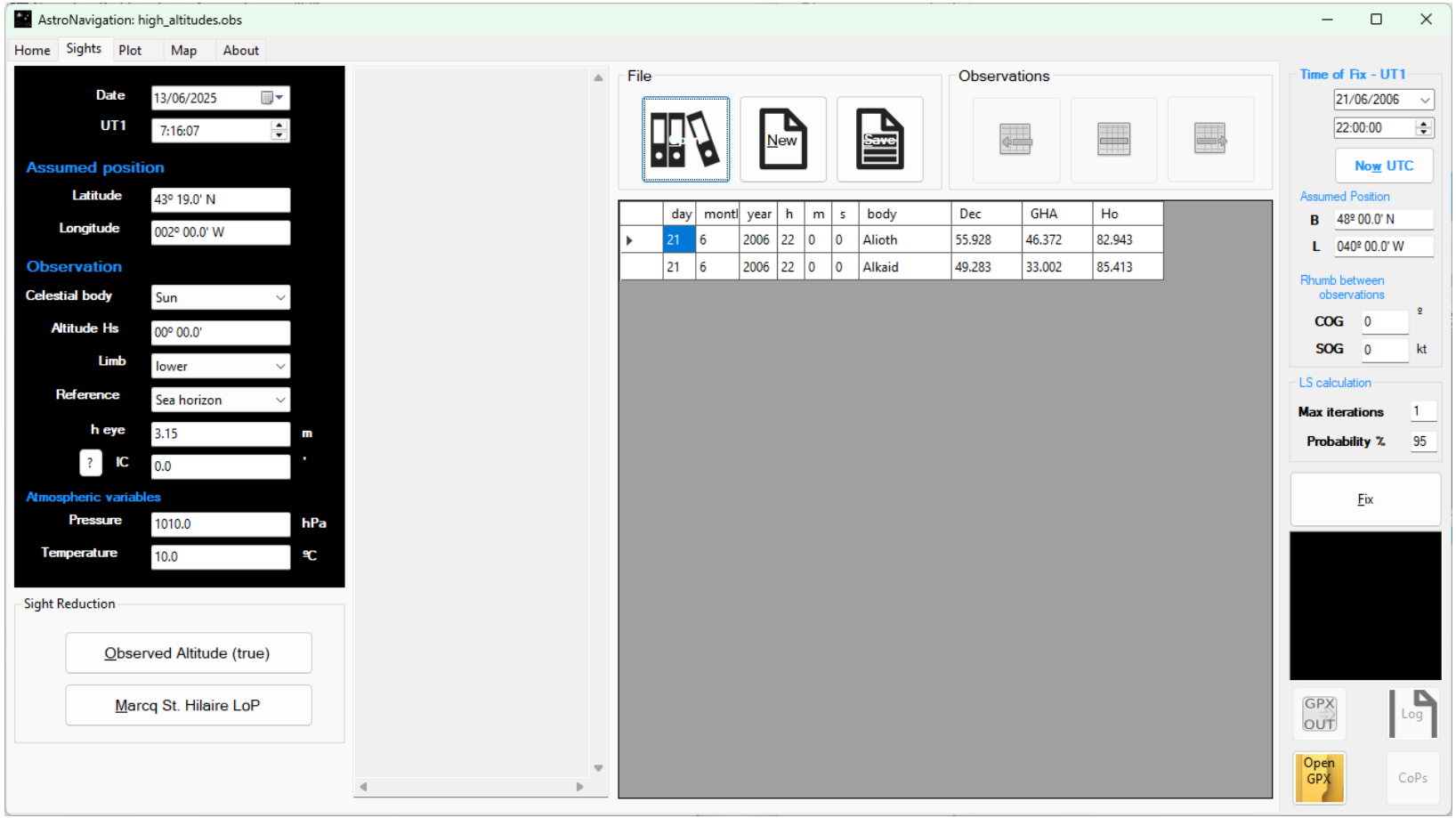
Can be edited with notepad

.obs

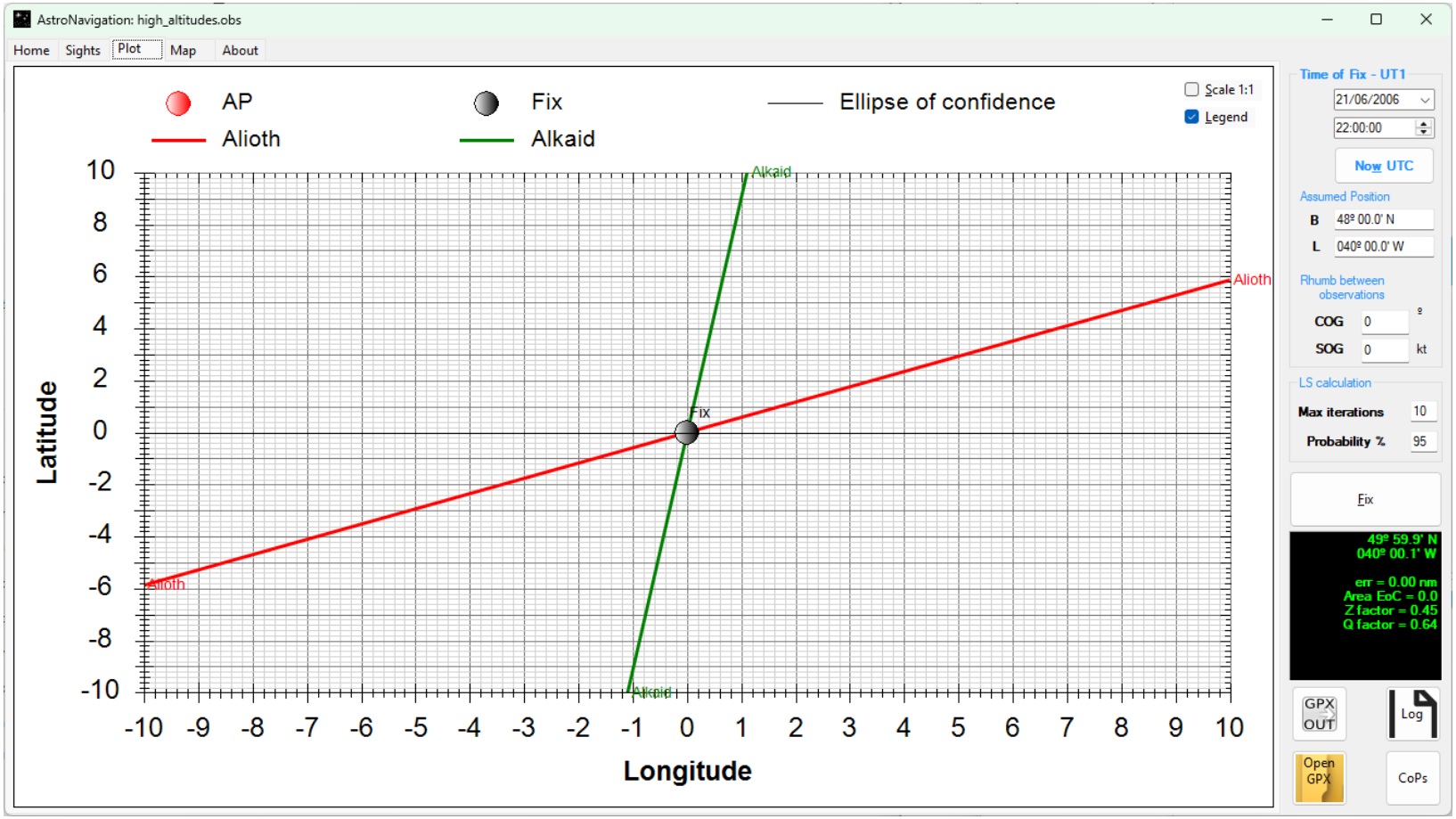
Date Fix	tFix	Bap(tFix)	Lap(tFix)	COG	SOG
date	ut1	body	GHA	Dec	Ho
date	ut1	body	GHA	Dec	Ho
date	ut1	body	GHA	Dec	Ho
date	ut1	body	GHA	Dec	Ho



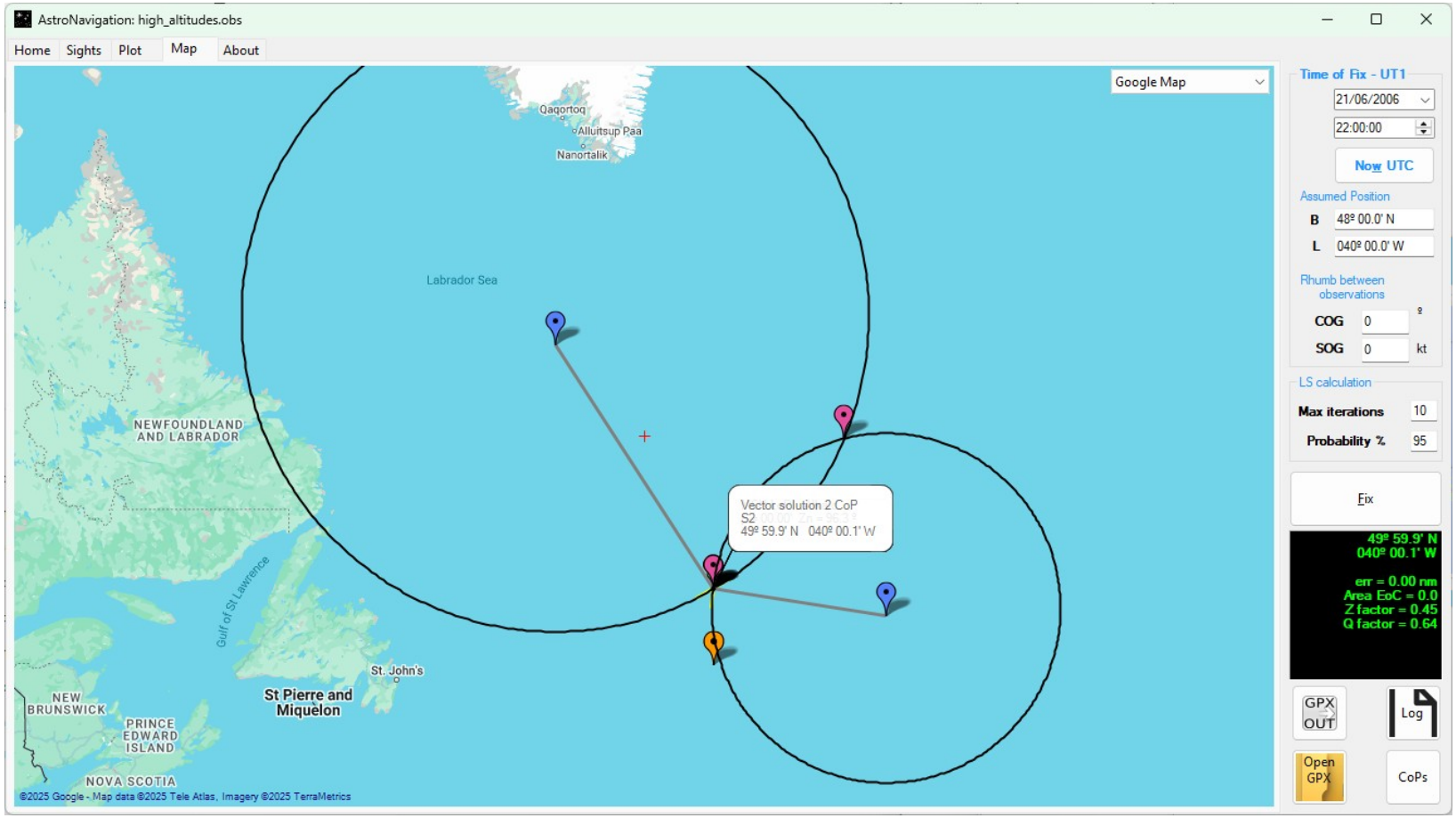
Example – Open File



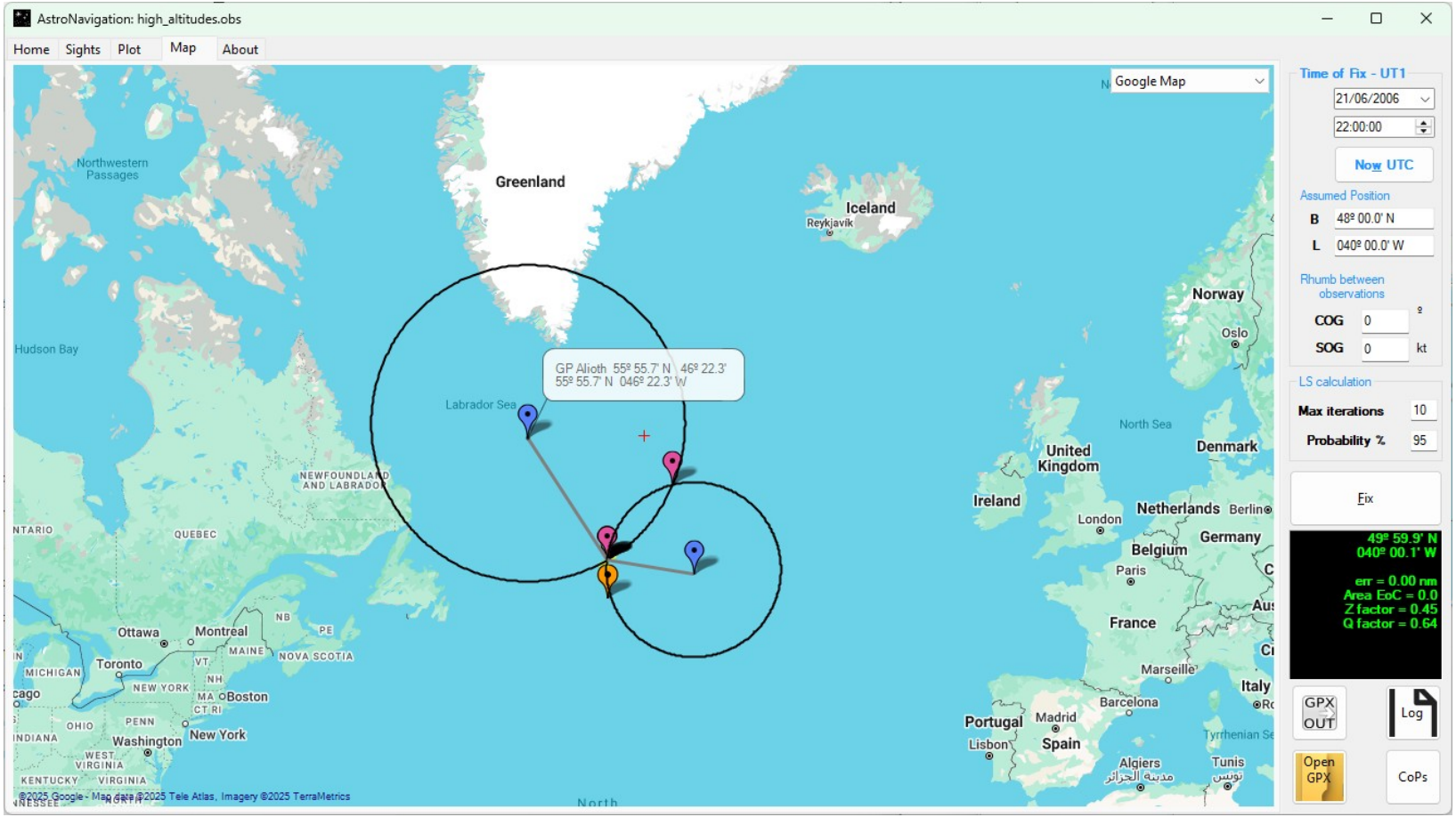
Example - Plot



Example - Map


AstroNavigation: high_altitudes.obs
Home
Sights
Plot
Map
About
Google Map
Qaqortoq
Alluitsup Paa
Nanortalik
Labrador Sea
NEWFOUNDLAND AND LABRADOR
Gulf of St Lawrence
St. John's
St Pierre and Miquelon
NEW BRUNSWICK
PRINCE EDWARD ISLAND
NOVA SCOTIA
Vector solution 2 CoP
S2
49º 59.9' N 040º 00.1' W
©2025 Google - Map data ©2025 Tele Atlas, Imagery ©2025 TerraMetrics
Time of Fix - UT1
21/06/2006
22:00:00
Now UTC
Assumed Position
B 48º 00.0' N
L 040º 00.0' W
Rhumb between observations
COG 0
SOG 0 kt
LS calculation
Max iterations 10
Probability % 95
Fix
49º 59.9' N
040º 00.1' W
err = 0.00 nm
Area EoC = 0.0
Z factor = 0.45
Q factor = 0.64
GPX OUT
Log
Open GPX
CoPs

Example - Map


AstroNavigation: high_altitudes.obs
Home
Sights
Plot
Map
About
Google Map
Greenland
Iceland
Reykjavik
Northwestern Passages
Hudson Bay
Labrador Sea
GP Alioth 55º 55.7' N 46º 22.3'
55º 55.7' N 046º 22.3' W
Norway
Oslo
North Sea
Denmark
United Kingdom
Ireland
Netherlands
Berlin
London
Belgium
Germany
Paris
France
Marseille
Italy
Barcelona
Portugal
Madrid
Lisbon
Spain
Algiers
Tunis
Tyrrhenian Se
NEWFOUNDLAND AND LABRADOR
QUEBEC
NTARIO
Ottawa
Montreal
Toronto
MAINE
NOVA SCOTIA
NB
PE
VT
NH
MA
CT
RI
Boston
New York
Washington
PENN
OHIO
MICHIGAN
NEW YORK
WEST VIRGINIA
VIRGINIA
KENTUCKY
INDIANA
cago
©2025 Google - Map data ©2025 Tele Atlas, Imagery ©2025 TerraMetrics
Time of Fix - UT1
21/06/2006
22:00:00
Now UTC
Assumed Position
B 48º 00.0' N
L 040º 00.0' W
Rhumb between observations
COG 0 º
SOG 0 kt
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Probability % 95
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040º 00.1' W
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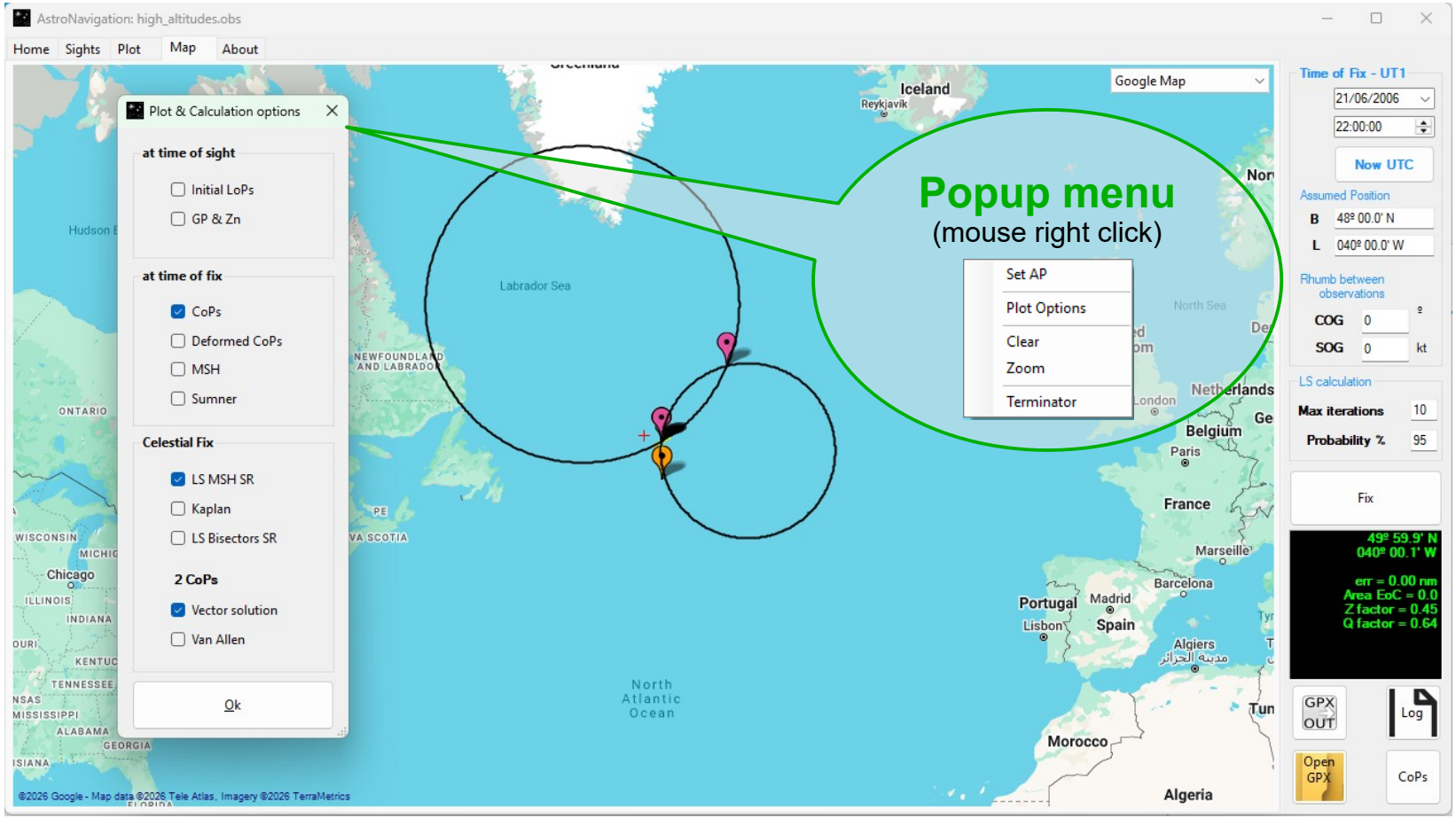
Area EoC = 0.0
Z factor = 0.45
Q factor = 0.64
GPX OUT
Log
Open GPX
CoPs

Example – Calculation & Plot options



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
…

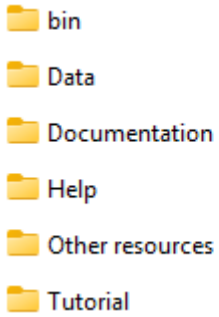
Help

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