idday Sun mer pass and Moon sight to cross – 2024

Scenario :

Actual position (AP) for entry in the app :

19o 50’.30” S, 26o 17’.12” W. (19o 50’.5 S, 26o 17’.2 W).

Date : Monday 12th Feb 2024

DR Position for use in the sight reduction process :

19o 09’.0 S, 26o 29’.0 W.

The aim is to obtain your latitude from a midday Sun mer pass. You can use the Planet Location Diagram to see if another heavenly body is available for a second sight at the same time to cross the latitude and give you a position.

The Planet Location Diagram is year specific so you need the 2024 version.

Draw a line across the diagram on the 12th Feb.

The central 12h horizontal line represents the sun’s mer pass and is the chart’s reference line. Where the moon line crosses the blue 12th Feb line, there is a crescent moon that has its mer pass around 3 hours after the sun’s. You don’t need its mer pass but the diagram tells you that the moon follows the sun and will be visible around midday when you are shooting the sun. The same applies to Jupiter around 5 hours behind but will probably be too low in the sky for a good sight.



Keep zooming in.

Take the sight as :

Hs = 830 37’43”

ie 83o 37’.7

Using the proformas, you firstly need to sort out the sun’s mer pass time.

|  |  |  |
| --- | --- | --- |
| MER PASS - SUN | Day Date / Month | Notes and calculations |
| Date | Monday 12th Feb 2024 |  |
| DR Posn Lat | 19o 09’.0 S |  |
| Long | 026o29’.0 W |  |
|  | hr : m : s |  |  |
| Mer Pass UT @ Gr | 12:14:00 |  |  |
| DR Long +W corn |  1:46:00 |  | From Convn of Arc to Time table |
| Mer Pass UT @ DR | 14:00:00 |  | Target Mer Pass time |
| Confirm date | Same |  |  |
|  | SUN |  |  |
| Sight time | 13:59:23 | Actual sight time | Time of maximum observed altitude. |
| Hs | 83o 37’.7 | LL |  |
| IE | 0 |  |  |
| Dip | 0 |  |  |
| Ha | 83o 37’.7 |  |  |
| Corrn |  +16’.1 |  |  |
| Ho | 83o 53’.8 | LL |  |
| Decn (Sun) 13 hr : S | 13o 45’.1 | Enter d value |  |
| d +/- +0.8 Corrn |  + 0’.8 |  |  90o 00’.0 |
| Decn (Sun) : S | 13o 45’.9 |  | Ho - 83o 53’.8 |
| ZD |  6o 06’.2 |  | ZD 6o 06’.2 |
| Latitude | 19o 52’.1 | S | Latitude = Dec + ZD |
|  |  |  |  |



Compare to the AP latitude of 19o 50’.5 S. This is close enough to show your workings are correct.

You can now find and shoot the moon’s upper limb to give you a crossing position line. It is not brilliant but as it is available it will give you a reasonable position instead of just the latitude.

Assume you take the sight a few minutes later at 14:06:18 UT@DR.

After zooming in you can read off 51o 54’ 25”, ie 51o 54’.4.

|  |  |  |
| --- | --- | --- |
| MOON SIGHT | Day Date / Month / Year | Notes and calculations |
| Date | Monday 12th Feb 2024 |  |
| DR Posn Lat | 19o 09’.0 S |  |
| Long | 026o29’.0 W |  |
|  |  |  |  |
|  | hr: m : s |  |  |
| Sight time | 14:06:18 | UT @ DR |  |
|  | MOON |  |  |
| Hs | 51o 54’.4 | UL | Look up GHA, DecN, V, d & HP |
| IE | 0 |  | at this point, need HP to get |
| Dip | 0 |  | Ho. |
| Ha | 51o 54’.4 |  | 14Hr GHA 351o 13’.1, S 1o 12’.0,  |
| First Corrn + | 45’.5 |  | V= +10.6, d= +17.7, HP 60.7 |
| \*HP 60.7 Corrn + | 4’.6 | UL |  |
|  | -0O 30’.0 | applies UL ONLY | 51o 54’.4 |
| Ho | 52o14’.5 |  | 45’.5 |
| GHA 14 hr | 351o 13’.1 | \*Ent V, Decn, HP, d | 4’.6 |
|  06 m 18 s | 1o 30’.2 |  | 52o 44’.5 |
| \*V +/- +10.6 Corrn | + 1’.1 |  | * 30’.0
 |
| GHA Moon | 352o 44’.4 |  | 52o14’.5 |
| CP Long -W | 26o 44’.4 | W |  |
| LHA Moon |  326o | (whole number) |  |
| \*Decn 14 hr S | 1o 12’.0 |  |  |
| \*d+/- +17.7 Corrn | + 1’.9 | Inc & Corr 6 mins |  |
| Decn Moon S | 1o 13’.9 | Same / ~~Contrary~~ |  |
| CP Lat |  19o S | ~~N~~/S (whole number) | From Vol 2 : 52 08 +30 114 |
| Hc | 52o 08’.0 | \*Enter d & Z |  |
| \*d+/- +30 Corrn | + 10’.0 | Table 5 | Column ‘d’, row ‘Decn minutes’ |
| Hc | 52o 18’.0 |  |  |
| \*Z | 114o |  | LHA > 180, southern hemi. |
| Zn | 66o |  | Zn = 180 - Z |
| Intercept | 3.5nm | Away (Hc > Ho) |  |
|  |  | Towards (Hc < Ho) |  |
| Bearing Zn | 66o |  |  |

The fix at 14:06 UT@DR was :

19o 52’.1S, 26o 20’.3W.

TeacupNav came out with 19o 50’.7S, 26o 18’.1 W.

These compared to the AP of 19o 50’.5S, 26o 17’.2W.