1. Determining the time of the meridian passage. Norfolk, Virginia. 22 January 2011.

I was confident it was sometime well after noon local watch time but I found I could not make sense of how to use NA’s equation of time. NA gives mer. pass. as 12 hrs. 11 m and the equation of time for noon as 11 m 29 sec. (I inferred from Bowditch that I should add these two. But adding them gives a value outside the range of possible variation. ) The website timeanddate.com put LAN at Norfolk, Va at 12:17. I used this as my initial estimate.

I recorded five shots, all lower limb sun shots. The first two I made at set times and recorded the angles. The last two I waited for a return of the second and then the first altitudes, recording the times when this occurred.

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| --- | --- | --- | --- |
| Sight (WT) | Hs | Ha | Ho |
| noon | 66º 16’ | 33º 08’ | 33º 22.8’ |
| 12:15 | 66º 36’ | 33º 18’ | 33º 32.8’ |
| 12:17 | 66º 35.6’  | 33º 17.8’ | 33º 32.6’ !?! |
| 12:19:23 | 66º 36’ | 33º 18’ | 33º 32.8’ |
| 12:34:20 | 66º 16’ | 33º 08’ | 33º 22.8’ |

Because I am using an artificial horizon I made no dip or altitude corrections. Ha is just Ha divided by two. Ho is Ha plus 14.8 for lower limb correction.

The noon sight and its mirror altitude sight gave an average of 12:17:10. The 12:15 sight and its mirror average to 12:17:12. The average of those two averages is 12:17:11. My time zone is GMT plus five. So I made out meridian passage at my site as occurring at 1717:11 GMT.

1. Determining Latitude

Zenith distance = 90º - 33º 32.8’ = 56º 27.2’ N

Dec (tab) = S 19º 38.5’

d = .06 d corr = 0.4’

Dec = S 19º 38.9’

Latitude = z – Dec = 36º 48.3’ N

1. Determining Longitude

GHA (hr) = 72º 06.8’

GHA m/s = 4º 17.8’

GHA = 76º 24.6’

Longitude = GHA = 76º 24.6’ W

According to my handheld GPS, a Garmin GPSmap 76Cx, my location was actually

36º 50’ N

76º 21.7 W

for a difference of 1.7’ of latitude and 2.9’ of longitude.

Conditions were somewhat less than ideal and accuracy may have suffered. Obviously there is something wrong with the middle of my five sights. It was a very windy day and the glass covers on the Davis artificial horizon permit some drafts to intrude and disturb the reflective surface. It was a very cold day (-4 C) and this made for some fogging of the AH and perhaps of sighting scope. Finally, there was a haze becoming clouds and overcast as the sighting progressed.