

Using the USNO Navigational Star Chart for monthly star identification

The USNO's Navigational Star Chart is useful in many ways. This writing will be limited to showing you what stars will be located on your meridian at 7 PM Local Standard Time. This is an approximate method of showing what stars will be visible to you at your longitude. By *longitude* and *meridian* it is meant an imaginary line passing through your location pointing to True North and True South.

Use the following example date and time;

November 1, at 7 PM Local Standard Time (the year doesn't matter)

Take the chart in hand and find where November is printed on the chart's lower left hand corner. Notice the vertical thick line pointing at November. Depending upon your Latitude, if you were to go outside at night you would find the stars Fomalhaut, Enif and Al Na'ir close to your meridian. That's close enough for easy star viewing. As each month progresses move to the left of the current month 1° for each day of the month. November 8th would be approximately located at the 30° mark just to the left of November. As you might have guessed, the distance between each month is about 30° - or 1° for each day.

On the chart you can draw a horizontal line to indicate your latitude which will set your Zenith distance which is the area in the sky directly over your head. Example- N 30° . Draw a line from the left hand side of the chart at 30° (above 0° at the ecliptic) to the right hand side of the chart at 30° (above 0° at the ecliptic).

For a more refined star viewing set a pair of dividers to 90° using the vertical latitude scale at the right or left hand side of the chart. Place one point of the dividers at your latitude of, say, N 30° . Rotate the dividers around that single point and you'll get a better idea what stars you really can see. Again, it's not a precise method but it's *close enough*.

Brief conclusion

This is all you need to know to find the particulars stars that are visible at 7 PM Local Standard Time at your location on the first day of each month. Move the monthly reference *left* 15° for each hour past 7 PM. That way you can find which stars are visible during the Summer when the Sun sets later. To be more precise, move an additional degree *left* for each day past the first of the month. Remember- this is just for general viewing and general star locations at a particular time. It isn't meant to be precise.

How the monthly positions were determined

The placement of each month on the chart is determined by obtaining the GHA Υ (Greenwich Hour Angle Aires) found in The Nautical Almanac for the first day of each month at the GMT of 7 PM Local Standard Time. Next, in western longitudes, your time zone degree figure is subtracted from the GHA Υ to get the LHA Υ (Local Hour Angle Aires). In eastern longitudes your time zone degree figure is added to the GHA Υ to get the LHA Υ (Local Hour Angle Aires). Two examples follow.

For western longitudes

Location- Cape May, New Jersey

Date- November 1, 2017 (the year isn't important)

Time zone- R, W 075° (GMT -5 hours= LST)

GMT = 00:00 = 7PM LST (24:00 *minus* 5= 19:00 = 7 PM)

GHA Υ at GMT 00:00 = 40° 28.3' (round it down to 40°)

If GHA Υ is less than your longitude add 360° to it.

$$\begin{array}{r} 360^\circ \\ + 40^\circ \\ \hline 400^\circ \end{array}$$

In western longitudes the GHA Υ figure is subtracted from your time zone degree figure to obtain the LHA Υ .

$$\begin{array}{r} 400^\circ \\ - 75^\circ \\ \hline 325^\circ \text{ LHA } \Upsilon \end{array}$$

For eastern Longitudes

In eastern longitudes the GHA Υ figure is added to your time zone degree figure to obtain the LHA Υ figure.

Location- Mauritius (Indian ocean)

Date- November 1, 2017 (the year isn't important)

Time zone- D, E 060° (GMT +4 hours= LST)

GMT = 15:00 = 7PM LST (15:00 *plus* 4= 19:00 = 7 PM)

GHA Υ - 266° 05.3' (round it down to 266°)

$$\begin{array}{r} 266^\circ \\ + 60^\circ \\ \hline 326^\circ \text{ LHA } \Upsilon \end{array}$$

Next step

Look at the very bottom of the USNO Navigational Star chart and find the **←---LHA Υ ---** range. These figures were added by me and not part of the original chart. Each printed whole degree figure is spaced 30° apart and begins horizontally at 0° on the right hand side of the chart and ends at 360° on the left side. Placement of each month using the LHA Υ figure is measured horizontally beginning at 0° from the right side of the chart and ending at 360° on the left side of the chart. For the examples above, the LHA Υ for November 1 at 7PM Local Standard Time is about 325°. The stars on either side of a vertical line (representing your meridian...your location) will be the stars visible, approximately, at 7 PM Local Standard Time. For each additional hour move the reference point 15° to the left. For more approximate accuracy you can also move the reference point 15° to the left for each day past the first of the month.

Navigational Star Chart monthly instructions.odt

Fair winds, clear skies & following seas



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NAVIGATIONAL STAR CHART

U.S. Naval Observatory / Astronomical Applications Dept.

