



Navigational Planning

Celestial Navigation Basics



How Celestial Navigation may be Integrated in our Daily Routines

WHAT WE CAN DO, with Sun only.....

Mid-morning

- Reduce a sun sight for a morning line
- If a Noon sight is planned: determine the time to start taking sights

Noon (if planned for)

- Obtain a sun line, advance the morning sun line for the noon fix

Mid-Afternoon

- Reduce a sun sight for an afternoon sun line

NOTE.....

We take quite a lot for granted – in this program -, as we don't calibrate our instruments (chronometer, compass, sextant).....

We also leave out the options of using planets, stars and moon for an 'instantaneous' fix.....

THE DAY'S WORK IN CELESTIAL NAVIGATION

2013. Celestial Navigation Daily Routine

The navigator need not follow the entire celestial routine if celestial navigation is not the primary navigation method. It is appropriate to use only the steps of the celestial day's work that are necessary to provide a meaningful check on the primary fix source and maintain competency in celestial techniques.

The list of procedures below provides a complete daily celestial routine to follow. This sequence works equally well for all sight reduction methods, whether tabular, mathematical, computer program, or celestial navigation calculator. See Figure 2013 for an example of a typical day's celestial plot.

1. Before dawn, compute the time of morning twilight and plot the dead reckoning position for that time.
2. At morning twilight, take and reduce celestial observations for a fix. At sunrise take an amplitude of the Sun for a compass check.
3. Mid-morning, wind the chronometer and determine chronometer error with a radio time tick.
4. Mid-morning, reduce a Sun sight for a morning Sun

line.

5. Calculate an azimuth of the Sun for a compass check, if no amplitude was taken at sunrise.
6. At LAN, obtain a Sun line and advance the morning Sun line for the noon fix. Compute a longitude determined at LAN for an additional LOP.
7. Mid afternoon, again take and reduce a Sun sight. This is primarily for use with an advanced noon Sun line, or with a Moon or Venus line if the skies are overcast during evening twilight.
8. Calculate an azimuth of the Sun for a compass check at about the same time as the afternoon Sun observation. The navigator may replace this azimuth with an amplitude observation at sunset.
9. During evening twilight, reduce celestial observations for a fix.
10. Be alert at all times for the moon or brighter planets which may be visible during daylight hours for additional LOP's, and Polaris at twilight for a latitude line.

Chapter 7, Chapter 17, and Chapter 20 contain detailed explanations of the procedures required to carry out the various functions of this routine.

The steps to get a position line:

1. Take a Sextant reading and convert it to the True Altitude (H_o).
2. Using the UT time of the reading, find the GHA and Declination in the Nautical Almanac.
3. Calculate the LHA in full degrees, by choosing a Longitude within 30' of your EP's longitude.
4. Assume a Latitude within 30' of your EP's latitude.
5. Check if we are on the SAME or CONTRARY hemisphere.
6. Write down the Calculated Altitude (H_c) and the bearing to the sun (Z_n) from the Sight Reduction Tables.
7. Calculate the intercept distance.
8. Adjust the universal plotting sheet to your EP/DR and AP latitude and longitude.
9. Plot your EP and AP, the Sun Line and the Position Line.

Celestial Navigation is time consuming and time dependent.
Duly plan for it in your daily routines.