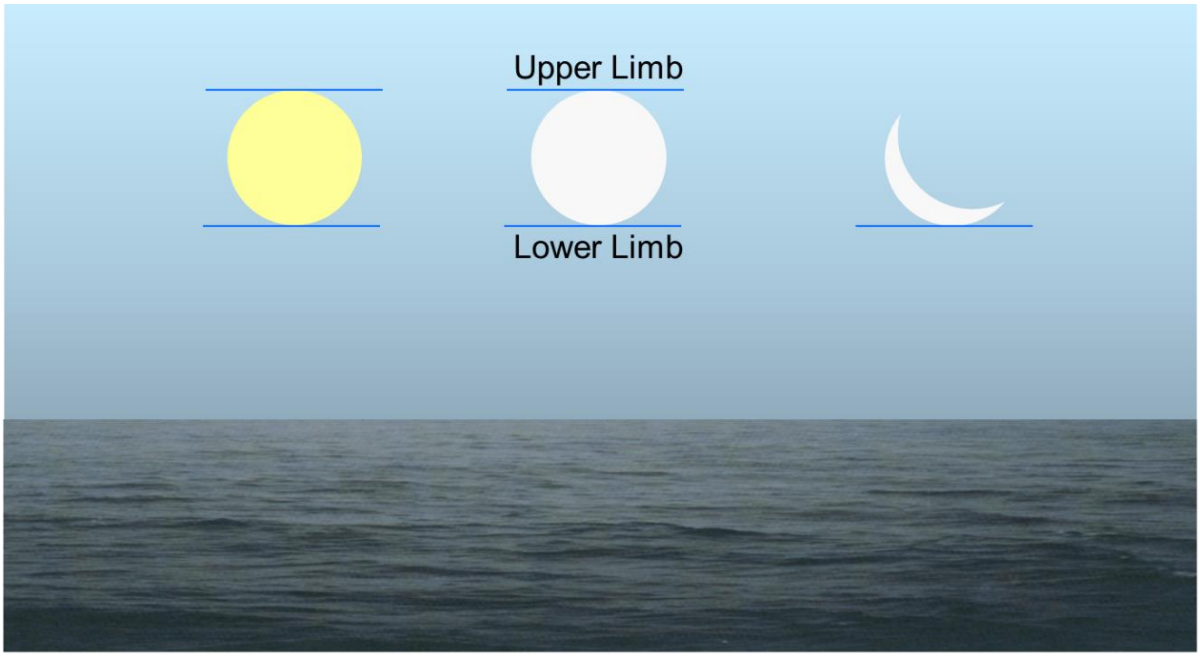
Master (Yachts)

Celestial Navigation

Lesson 1.3

Obtaining the ‘Sextant Altitude’ of a Celestial Body



Note
Use of the sextant will be examined during the oral examination.

Lesson 1.3

Obtaining the 'Sextant Altitude' of a Celestial Body

Ideally you should have a sextant to practice the techniques described in this Lesson.

Sextant altitude

The Sextant Altitude of a celestial body is the angular height of the body above the *visible horizon* as read from the Arc, Micrometer drum and Vernier scale of the instrument.

Altitudes can only be taken when both the body and the horizon are visible; for stellar and planetary observations this must be done during morning or evening twilight. The Sun and Moon may be observed during the day.

In the Nautical Almanac, in addition to the Sun and the Moon, planetary information is given for the four planets Venus, Mars, Jupiter and Saturn; these are clearly visible by eye in the night sky. Information is also provided for 57 selected stars. The aforementioned are the only celestial bodies that are used for celestial navigation purposes.

Planets and stars are defined by their appearance as sharp points of light against the night sky.

The Sun's disc must be viewed through the Index Shades and either the Upper Limb or the Lower Limb may be used for observation; it is normal to use the Lower Limb.

Great care must be taken when using the sextant for altitude observations of the Sun!

The Index Shades must be used to prevent the user looking directly at the Sun through the Index Mirror; the Horizon Shades are to protect the observer from any reflective glare of the Sun from the sea; particularly when the Sun is low in the sky.

ALWAYS use maximum shading initially and remove the shades progressively until the Sun's disc can be seen with no glare that may otherwise damage your eyesight.

The Moon's disc may be wholly or partially visible dependent on the phase of the Moon at the time of observation; only the Lower Limb may be observed in some instances.

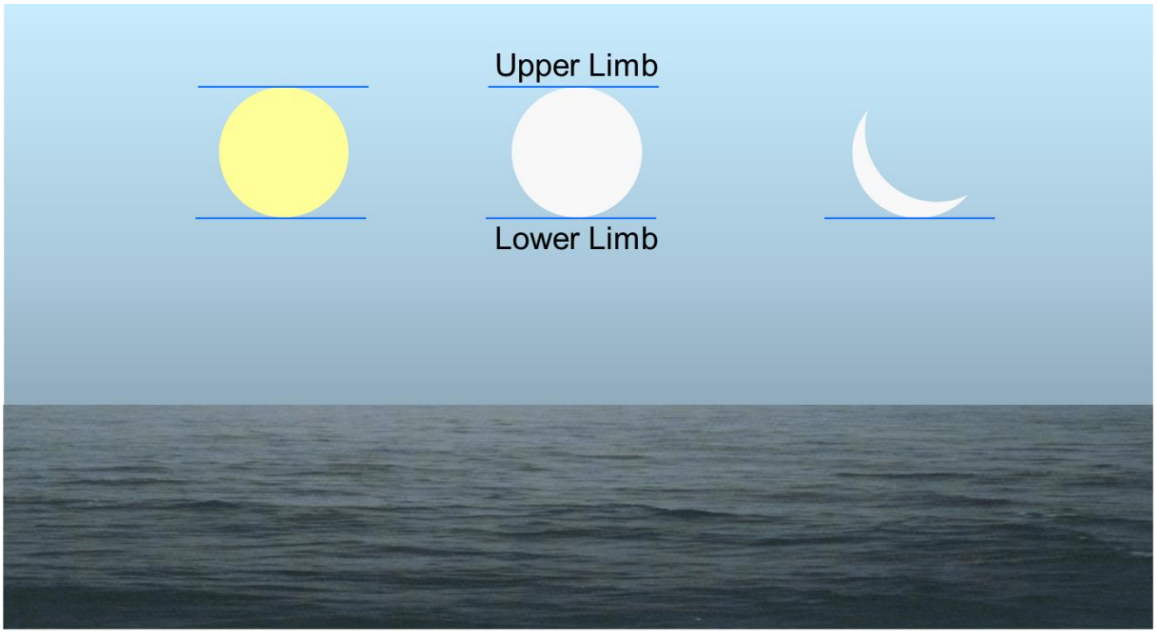


Fig. 1 – Sun and Moon Lower and Upper limbs.

Taking a sextant altitude
The following procedure should be followed:

(1) With the sextant in the right hand use the clamp and Micrometer drum to set the sextant to zero.

(2) Focus the monocle to obtain a clear image of the horizon, Moon or a star.

(3) For the Sun select the correct combination of Index Mirror shades.

(4) If necessary select the correct combination of Horizon Mirror shades.

(5) Sight the body directly through the monocle ensuring a steady stance.

(6) Release the clamp with the left hand.

You now have to bring the body down to the horizon smoothly and without loss of the reflected image.

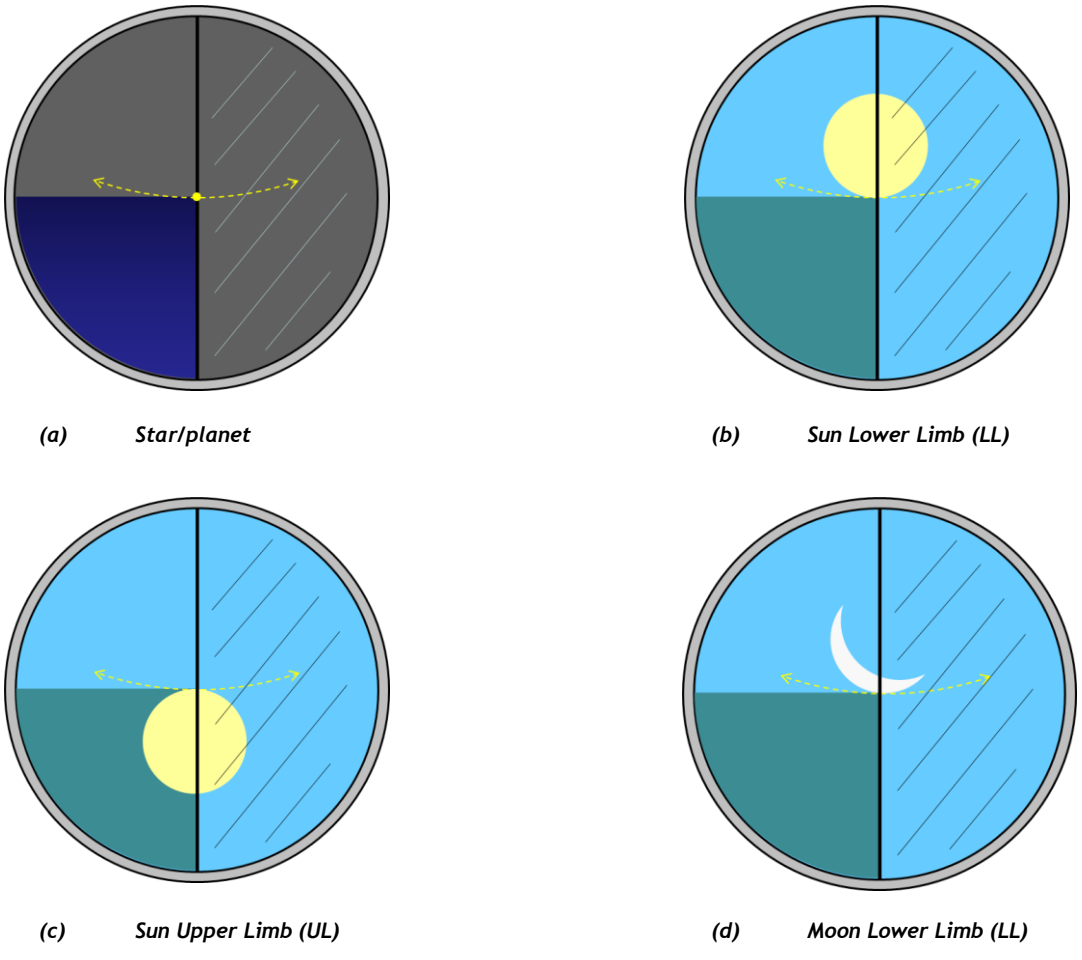
(7) Slowly move the index arm towards the horizon, dipping your head slightly downwards at the same time, until the body is close to the horizon, either just above or below it but as near as you can get it. Release the clamp ensuring that the teeth are fully engaged.

(8) Adjust the Micrometer drum until the star or planet just grazes the horizon; for a Sun or Moon observation do same until the chosen limb just grazes the horizon.

(9) Tilt the frame of the sextant to one side and then the other slightly making final adjustments on the Micrometer drum (this is known as *swinging* the sextant). The body (or limb of the body) should be seen to just graze the horizon. See figure 2.

(10) Once satisfied note the time and the sextant reading; it is common for some navigators to walk from the bridge wing to the chart table and to count the seconds 'one-thousand, two-thousand, three-thousand' and so on; read the chronometer and deduct the time in seconds taken to reach the chart table.

(11) Note the time and observed Sextant Altitude and if necessary repeat the process for further observations in the case of stellar observations.



(a) Star/planet

(b) Sun Lower Limb (LL)

(c) Sun Upper Limb (UL)

(d) Moon Lower Limb (LL)

Fig. 2 - Landing the body/limb on the horizon.

Having obtained the Sextant Altitude a number of corrections must be made to obtain the true altitude of the body – see Lesson 1.8.

If you have a sextant practice taking a Sextant Altitude of the Sun; use the top of a building as an artificial horizon if necessary. If possible do the same for any bright star at night.