# Shadow Display by Chris Skellern

ArborShadow can display a tree shadow for a single moment of time or can show its duration for a whole day as a 'day trace'. They are both shown graphically in 2D. You can imagine that are looking vertically down over the tree and viewing the projected shadow as a shaded area. The screen image will always be orientated with its top towards North.
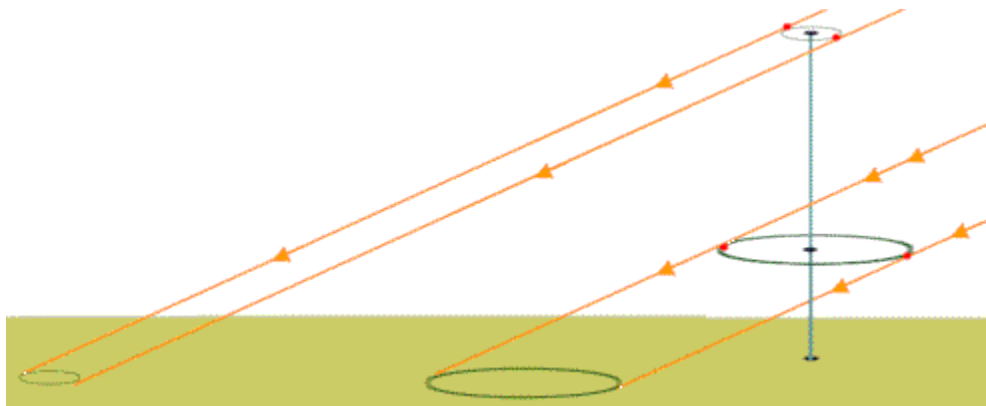
The Tree Shadow

The following picture shows a tree with its projected shadow laid over a 1 meter grid.
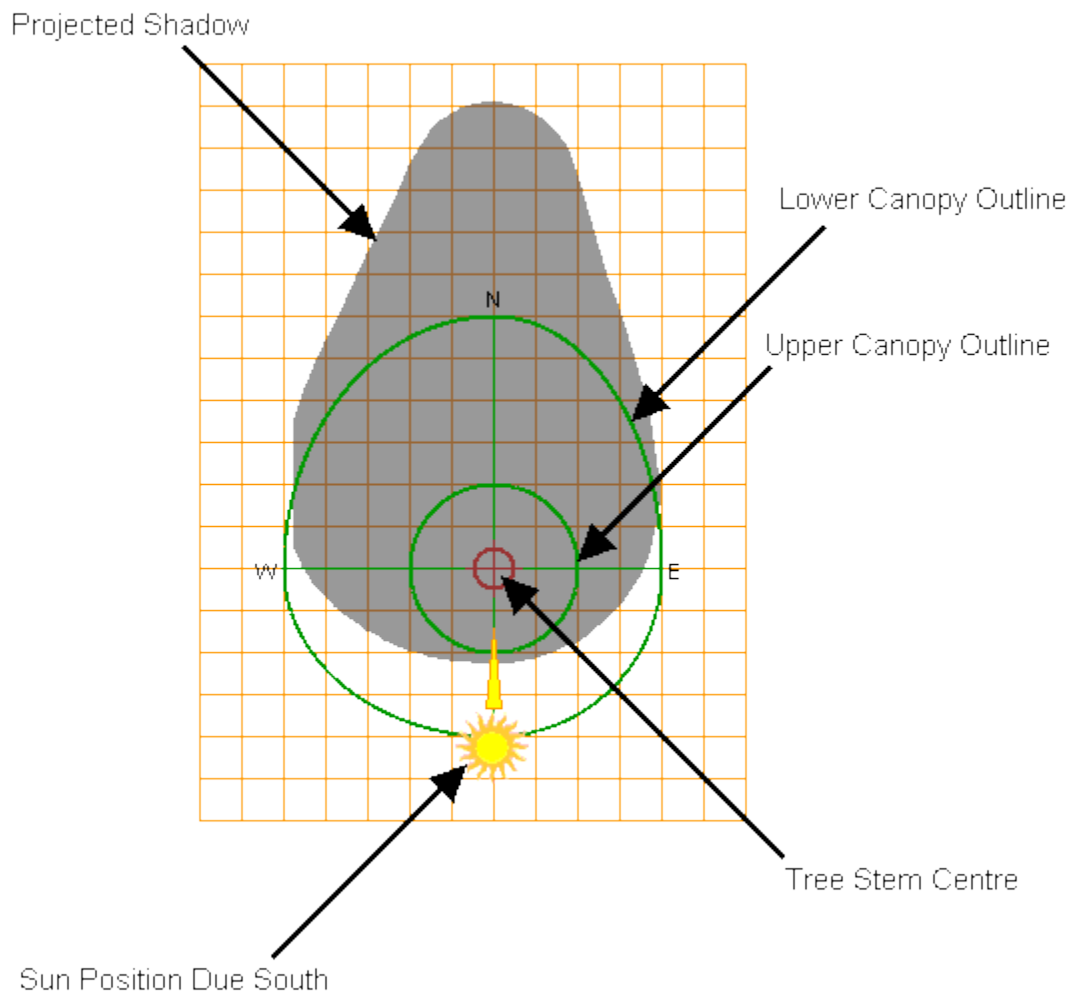
The shadows are created by projecting horizontal 'slices' of the tree canopy.

The following image shows the upper and lower canopy outlines projected onto the ground.

The upper and lower canopy projections can be seen within ArborShadow by selecting the 'Show Shadow Detail' selector from a drop down menu. The following image shows these projections outlined in blue. In this mode the detail also shows two shadow length dimensions. The 'Maximum length' is calculated using the presence of tree canopy spread (as these can increase distance) while the 'Simple Shadow Length' is calculated using just the tree height alone. The 'Width Markers' show the maximum width of the shadow when measured at right angles from the shadow centre line.
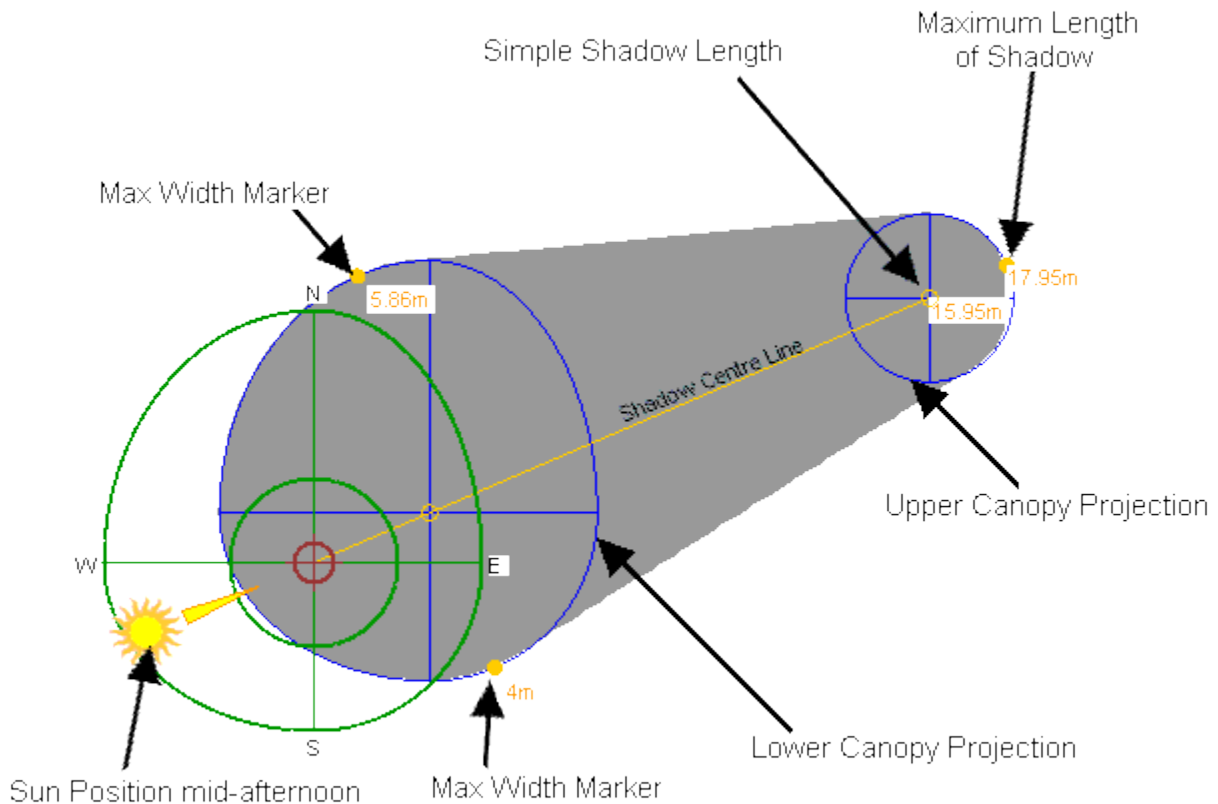
The following image shows the difference in the two shadow length calculations. Dimension A shows the 'Simple' calculation based upon tree height alone while B shows the true 'Maximum' shadow length. The influence of canopy spread can increase some broad tree canopy shadow lengths by a significant number of meters.
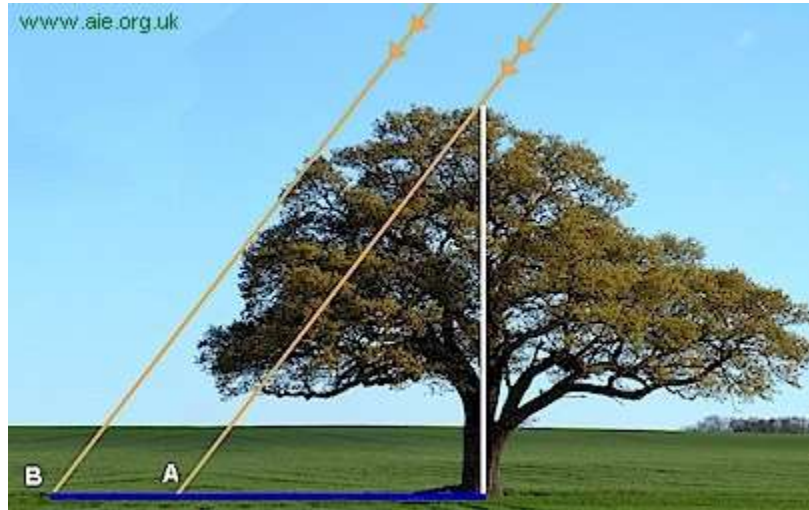
The Tree Shadow Trace

The tree Shadow Trace shows the area which the normal tree shadow would transit during a day. As the tree shadow moves from west to east its 'imprint' is recorded on the screen to leave a large shaded area. The smaller true shadow can be displayed on top if required (see below). Note the flat ends to the trace shadow on the eastern and western extents. This is a 100m cut off point (measured from the tree centre) which had to be included for memory conservation reasons. The grid below is spaced at 10m and the sun shows a position early in the day.