



Binoculars and Double Stars

A rewarding and challenging activity

<https://www.astroleague.org/binocular-double-star-observing-program/>



Effective Binocular Observing ...

- Binoculars must be precisely focused.
- Binoculars must be held steady. Mounted on a tripod is best.
- Adequate dark adaption is needed. Wait at least 15 minutes in the dark before meaningful observing begins. 30 minutes is better.
- Glare from a bright primary interferes with spotting a dim secondary. The greater the magnitude difference, the greater the difficulty splitting them.
- Steady atmospheric seeing is desired.
- Best observed when the double star has an altitude higher than 30°.

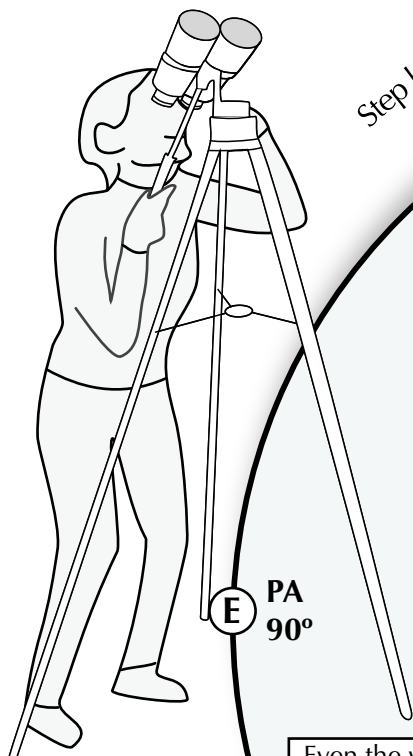
In Your Observing Notes:

- ☆☆ Brightnesses of the components.
- ☆☆ Separation of the components.
- ☆☆ Position Angle (PA).
- ☆☆ Colors of the components.
- ☆☆ Neighboring stars in the field?
- ☆☆ Seeing conditions.
- ☆☆ Atmospheric transparency.
- ☆☆ Altitude.

Rule of Thumb ...

Minimum true separation with 10 x 50 binoculars:

- 24 arc seconds for two stars of 4th magnitude. This equals 4 minutes apparent separation.
- For comparison, the full moon has a true diameter of 1800 arc seconds (=30 minutes).
- **True separation** is the angular space between stars as it appears to the unaided eye. **Apparent separation** is how it appears in binoculars.



Step back 1.5 m (4.75 ft) from this 150 mm (6 inch) printed field, and the 6° field will match 6° in the sky.



6° true angular field – typical for binoculars

Stellar Magnitude

- 2 ●
- 3 ●
- 4 ●
- 5 ●
- 6 ●
- 7 ●
- 8 ●

Example Doubles

- *Alpha Capricorni*
381", PA: 290°
- *Delta Cephei*
41", PA: 191°
- *Σ1474 Hydrae*
66", PA: 27°
- *56 Andromedae*
203", PA: 298°
- *Nu Draconis*
61", 311°
- *Alpha Ursae Majoris*
385", 206°



Relative diameter of the full moon.

Separation distance

- 600" = 10'
- 300" = 5'
- 120" = 2'
- 60" = 1'
- 40" = 0.67'

PA 90° E

PA 270° W

Even the wider doubles appear close to each other. Two stars that have a tight separation, or a large magnitude difference, or a combination of the two are much more difficult to split, sometimes frustratingly so, but an enjoyable challenge nonetheless.