Understanding Field of View (FOV)

There are two ways to consider field of view (FOV). The actual or true FOV is the angular measurement of the patch of sky you can see in the eyepiece. The apparent FOV is the angular measurement of the field that your eye sees in the eyepiece. An actual field of view might be half of a degree at low power, while the apparent field might be 50 degrees. For the rest of this article, we will "focus on" actual FOV.

When we measure sizes and separation distances of objects in the sky we use degrees, arcminutes and arcseconds. These are all units of angular measurement. There are 360 degrees in a complete circle of rotation. Each degree can be split into 60 arcminutes and each arcminute can be split into 60 arcseconds. Here are some example sizes of things:

At arms length:	
Width of little finger	1 degree
Width of first three fingers	5 degrees
Width of fist	10 degrees
Width of extended thumb to pinky	20 degrees

8x50 finder FOV	5 to 7 degrees
35mm Panoptic in a 12.5" f/5 scope	85 arcminutes
6mm Radian in a 12.5" f/5 scope	14 arcminutes
Moon	half a degree or 32 arcminutes
Jupiter	half an arcminute or 33 arcseconds
Mizar A/B separation	14 arcseconds

Measuring Eyepiece FOVs with Mintaka

A relatively simple method to measure your eyepiece FOVs can be done by letting the rightmost star in Orion's belt drift through the center of your eyepiece and timing how long it takes to cross the entire FOV. Take the number of seconds and divide by 4 to get the approximate size in arcminutes. NOTE: this only works well for stars near the celestial equator like Mintaka so don't be tempted to pick any random star for your measuring.

Using FOV

Ok, so now you have an idea how big your FOVs are, what good is that? Well, now you can look at sky charts and have an idea of how much you'll be able to see in your finder and eyepieces. You'll be able to plan how to "star hop" from an easy-to-find bright star to a faint difficult to see deep sky object.

Formulas

Here are some formulas you can use to calculate other eyepiece attributes:

magnification = telescope focal length/eyepiece focal length

focal ratio = focal length/aperature

focal length = aperature x focal ratio

exit pupil = telescope aperature/magnification
= eyepiece focal length/telescope focal ratio

true field of view = eyepiece field stop/telescope focal length x 57.3 degrees

References

- The Beginner's Observing Guide, Chapter 4 (RASC publication)
- http://huxley.org/astro/eyepieces.php
- http://www.scopesim.com/