

Stops, Pupils, and Field-of-View

Definitions

Stop: A stop is a device (or aperture) that limits the extent of an bundle of rays.

Aperture Stop: The stop which is most limiting to the cone of light passed by the optical system from an object on axis. The aperture stop can be a function of the object distance.

Field Stop: A field stop is a stop (other than the aperture stop) that limits the angle of light that can pass through the aperture stop.

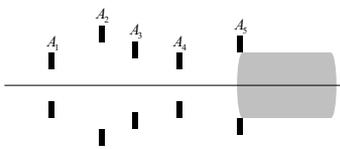
Pupil: A pupil is the aperture stop seen from a particular space.

Entrance Pupil: The aperture stop seen from object space.

Exit Pupil: The aperture stop seen from image space.

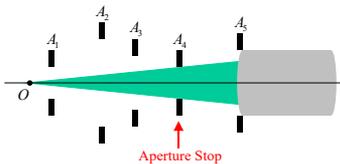
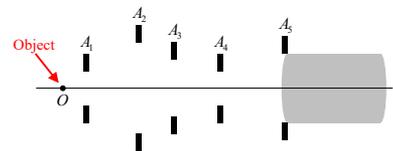
Field of View (FOV): The span of object space that is imaged by the system.

Determining the Stops



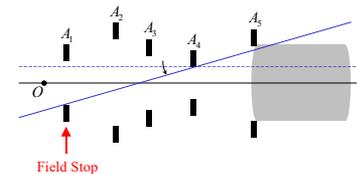
1) Trace all possible apertures into a common space (i.e. object, image, intermediary).

2) Choose an on-axis object location. This may be application dependent.



3) The aperture that most severely limits the angle of light from the object is the aperture stop.

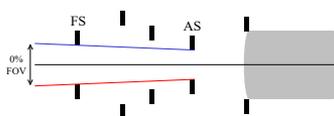
4) Rotate a ray counter clockwise about the top edge of the aperture stop until the ray glances the edge of another aperture. This aperture is the field stop.



Determining the Field of View (FOV)

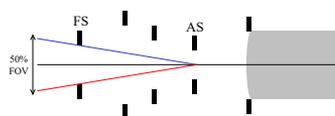
0% Vignetted FOV

Defined by a ray glancing same side edges of the field stop and aperture stop.



50% Vignetted FOV

Defined by a ray passing through the center of the aperture stop to either edge of the field stop.



100% Vignetted FOV

Defined by a ray glancing opposite edges of the field and aperture stop.

