

**Definitions / Tables (Part 1 of 2)**

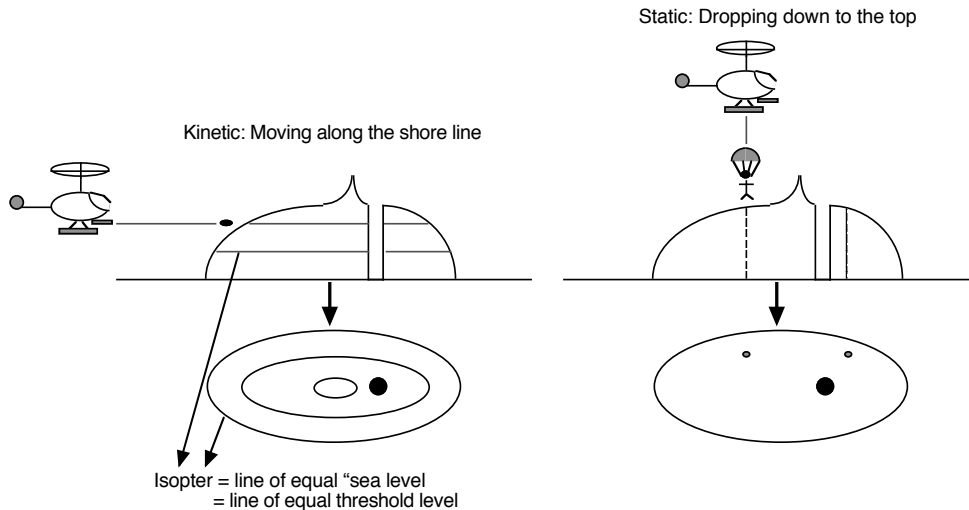
Range: 60° Superiorly  
 60° Nasally 75° Inferiorly 110° Temporally

As a result of having a nose!:

- Nasal retina has largest representation (temporal VF)
- More fibers cross at chiasm
- “Temporal island” of cortical mapping for unmatched VF area

Visual field: “An island of vision in a sea of blindness”

Static versus Kinetic Perimetry: The helicopter approach to the island of vision:



Unit of Threshold:

- For “sea level” = atmospheres of pressure or meters above it
- For perimetry = decibel (dB) { 1 dB = 0.1 log units of signal attenuation }
- 0.5 log unit change = significant; 5° nasal step = significant if > 1 isopter

Static vs. Kinetic:

- Shallow scotomas can be missed or shaved over by kinetic
- Narrowing of isopters if come in too fast (kinetic)
- More interobserver error with kinetic
- Predictable testing pattern with kinetic
- Lower sensitivity with kinetic

Stimulus Size	Diameter (mm)	Area (mm <sup>2</sup> )
O	0.28	1/16
I	0.56	1/4
II	1.13	1
III	2.26	4
IV	4.51	16
V	9.03	64

Each step increase in size = 2x diameter = 4x area

0dB = brightest spot machine can produce against the background

- Threshold = the smallest, least bright stimulus seen on 50% of test trials
- At the top of the island, a short jump or small stimulus can be seen (static) and a weak shot can shave off the surface of the island (kinetic)
- At the bottom of the island, a hard fall or strong stimulus is needed (static) and a strong shot/explosion is needed to shave the island (kinetic)
- The greater the intensity required, the brighter and bigger the spot needed and thus the closer the bullet or paratrooper is to sea level or blindness
- Smaller number = lower intensity and/or smaller size = increased signal attenuation
- I4e: 6dB change per Roman numeral (O-V) {= size attenuation}
  - 5dB change per number (1-4) = 0.5 log unit {= intensity attenuation}
  - 1dB change per letter (a-e) {= intensity attenuation}
  - Thus I4e isopter is about equivalent to a II3e isopter
- Letters b,d not usually used
- O1a to V4e > 4 log unit change (10,000 fold change)

• Filter Intensity {apostilbs (asb)}

- 1e 31.5 (= background cupola intensity for Goldmann)
- 2e 100
- 3e 315
- 4e 1000 = 0dB = no attenuation of the 1000 asb source

1	0.0315	0.025	0.02	0.016	0.0125
2	0.1	0.08	0.063	0.05	0.04
3	0.315	0.25	0.2	0.16	0.125
4	1.00	0.8	0.63	0.5	0.4
	e	d	c	b	a

**Testing Algorithms**

Static

versus

Kinetic

Screening / Threshold

Threshold

- Definitions (MD, SF, CLV...)
- Reliability Criteria
- Progression Criteria
- Algorithms (SWAP, FDP, SITA)

## Goldmann (940-K3) Kinetic Perimetry

- Position accordingly (chin rest, eye patch to untested eye, lens correction)

<u>Age</u>	<u>Add required (D)</u>
30-39	+1.00
40-44	+1.50
45-49	+2.00
50-54	+2.50
55-59	+3.00
> 60 or aphakic	+3.25
- Map blind spot
  - Patient reliability
  - 10-15° from fixation, few degrees below the horizontal midline
  - I4e test stimulus
  - Move from nonseeing to seeing areas at 3°/second
  - The point at which the target is seen is marked on the recording paper
- Threshold @ 25° from fixation
  - Temporal side of field 25° laterally, 15° superior to horizontal meridian
- Central 76 static test locations
  - 5°, 10°, 15° on each meridian
  - • = seen; O = missed once; X = missed more than once
  - Plot isopter also
- Map scotomas (relative vs. absolute)
- Peripheral (Nasal) isopter
  - 30° above and below horizontal (glaucoma)
  - (Neuro field: I4e, I2e 30° to right and left of vertical meridian)
  - Start @ 60° for I4e
  - Slide in 15° tract to allow reaction time
  - Map I4e, IV4e
- Threshold @ 55° temporally, few degrees above horizontal
- Static testing of temporal VF (often omitted)
  - 25 points on radial meridians @ 30°, 40°, 50°
  - • = seen; O = missed once; X = missed more than once

## Calibration

- Lock machine with the pantograph arm @ 70° on Right side
- Turn target to “on” (control switch on right side)
- Raise the light meter flag / shutter
- Set to V4e (= 0dB = no attenuation of the 1000 asb source)
- Adjust rheostat to get 1000 asb
- Calibrate the background V1e (31.5 asb) = 1.5 log units less than the 1000 asb of V4e
  - With the side flag / shutter lowered, look across the perimeter bowl at the light meter opening
  - The background luminance is adjusted by sliding the shutter control near the bulb housing

- Adjust the luminance until the background brightness (or the rim) equals the brightness of the projected spot (in the hole)

#### Color Vision Fields

- Central 4°: No blue; red & green only
- 4° to 20-30°: Trichromat
- 30-70°: Dichromat (red-green blind)
- > 70°: monochromat

#### Optics Trivia

- Bowl size = 333 mm radius
- Focal length of eye = 17 mm
- Ratio = 20/1
- Thus, the projected size of a retinal defect on a perimeter bowl is 20x
- A 1.5 mm diameter optic nerve projects as a 30 mm scotoma on the perimeter bowl. It doesn't look that big on the drawing because the pantograph reduces it in size to fit on 8.5 x 11" paper.