

New Automated Contrast Sensitivity System

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ETDRS Chart High contrast Acuity "Resolution"

Chart 1
 20/400
 20/300
 20/250
 20/200
 20/150
 20/125
 20/100
 20/80
 20/60
 20/50
 20/40
 20/30
 20/25
 20/20
 20/15

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Contrast Sensitivity

- Measures the limit (threshold) of our ability to see larger objects at the lowest possible Contrast
- Gray Truck in the Gray Fog

"Normal Vision"

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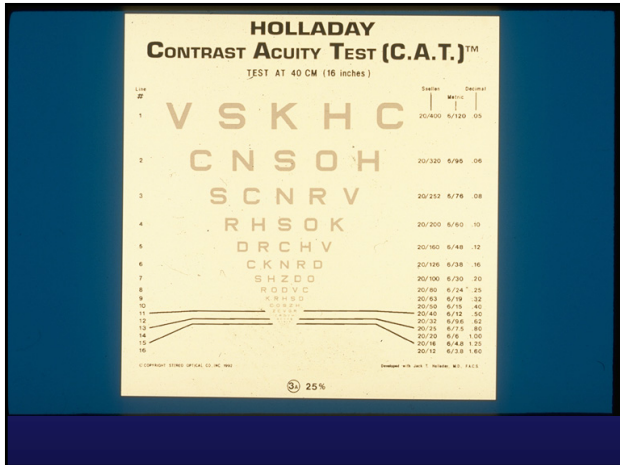
What if good vision could be better?

What is... What can be...

HOLLADAY CONTRAST ACUITY TEST (C.A.T.)™

is performed at 5 contrast levels:

100%	V	S	K	H	C
50%	V	S	K	H	C
25%	V	S	K	H	C
12.5%	V	S	K	H	C
6.25%	V	S	K	H	C



Problems with Current CSF

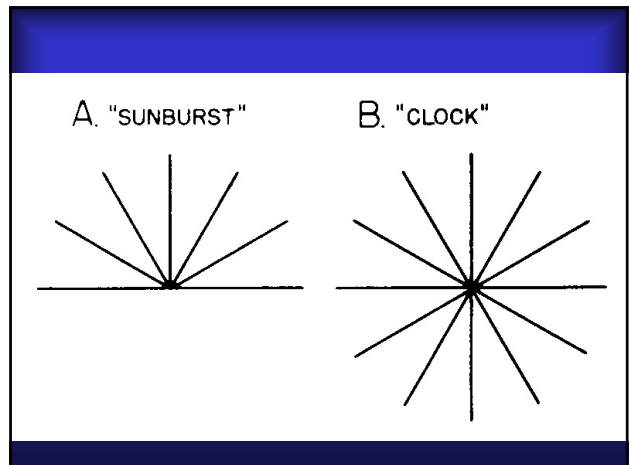
- **Brightness:** difficult to control with Charts due to roomlights and should be @ 85 and 3 Cd/m²
- **Vertical Linear Gratings:** biased for WTR astigmatism & Horizontal Coma
- **Blanking Period:** Photoreceptors should be "rested" before each presentation (~ 10 secs)
- **Response Time:** Should be a maximum time interval for response ~ 10 secs (not open ended)
- **False +'s:** Must have control target for "trigger happy" patient, resulting in "Reliability Index"

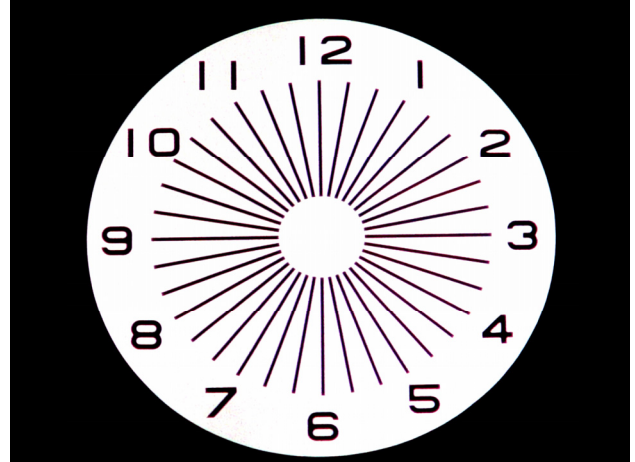
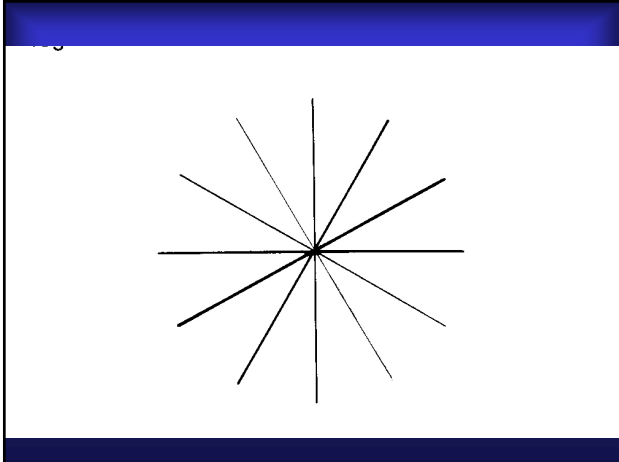
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- Jack T. Holladay, MD, MSEE, FACS
- Joe Marino, CEO
- Steve Nordstrom, Engineer

New CSF System

- **Brightness:** Calibrated Monitor with attached computer to 85 and 3 Cd/m²
- **New Optotypes:** Sinusoidal Bull's Eye,...
- **Blanking Period:** receptor refresh (10 secs)
- **Timed response:** 10 sec, not open
- **Reliability Index:** 0 to 100%
- **Automated Test** ~ 9 – 10 minutes / eye with smart threshold strategy and false + detection



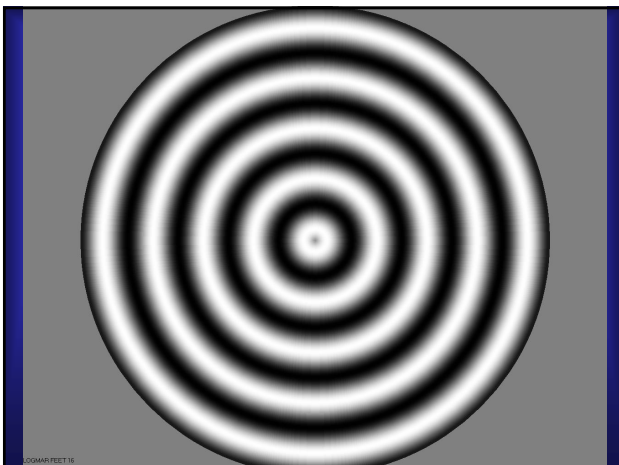


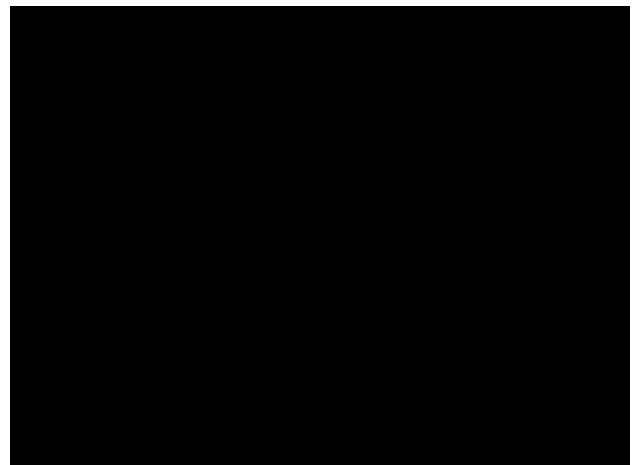
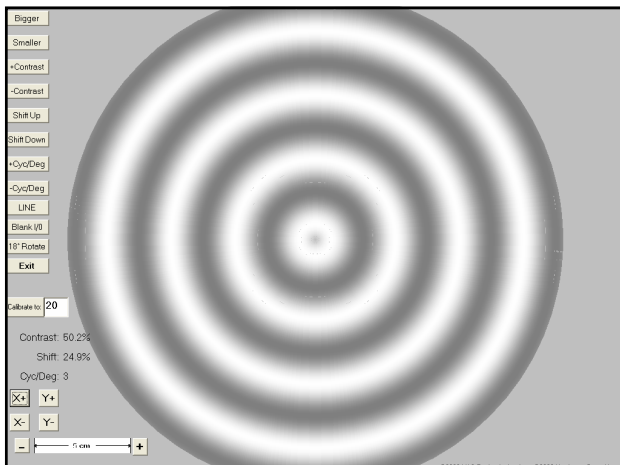
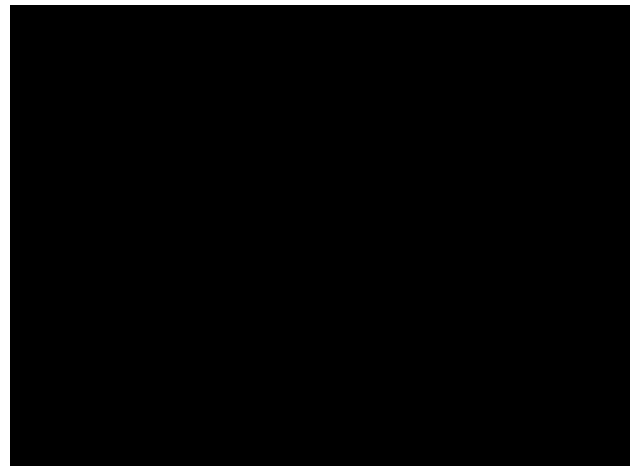
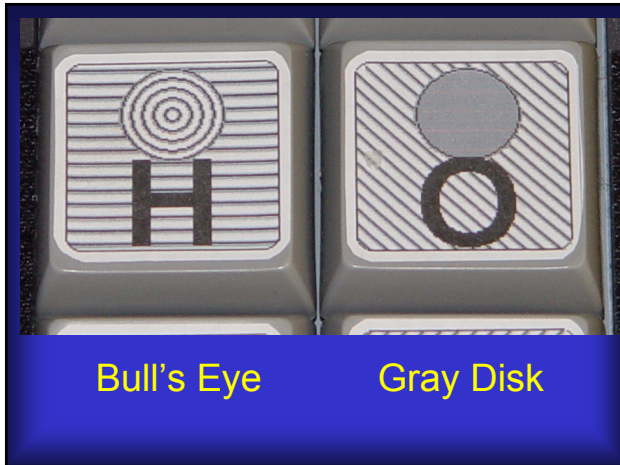
Sine-wave Gratings

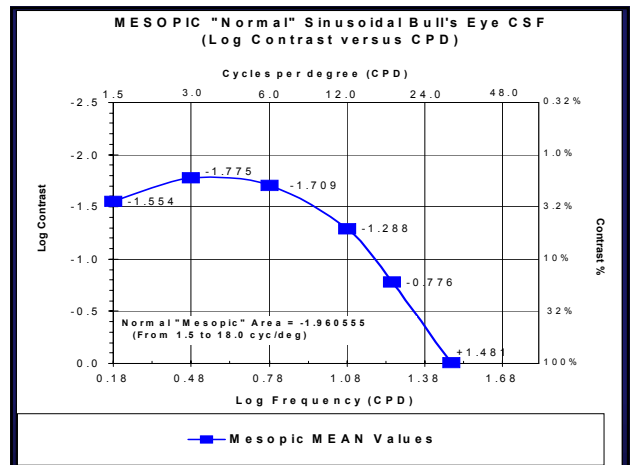
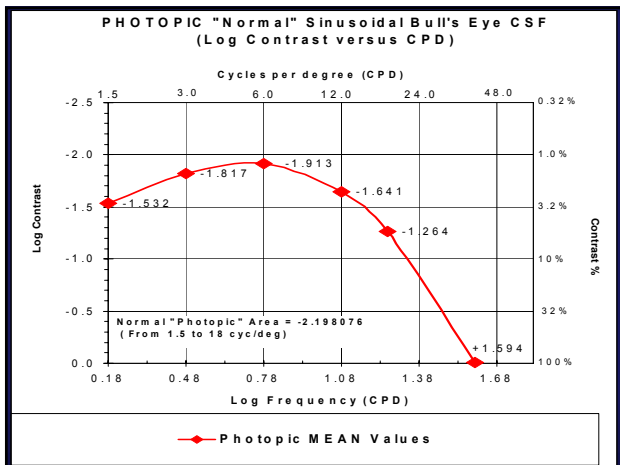
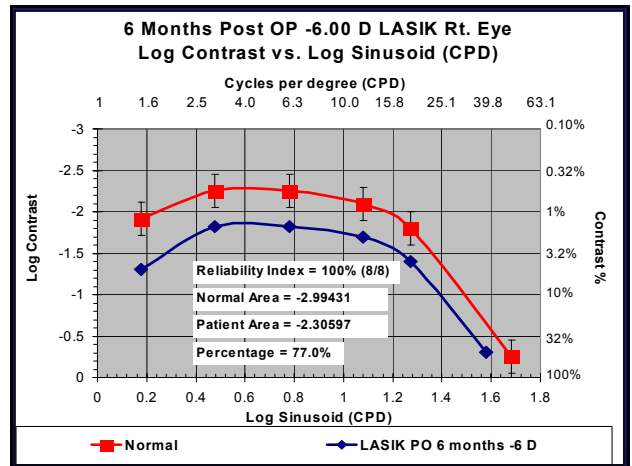
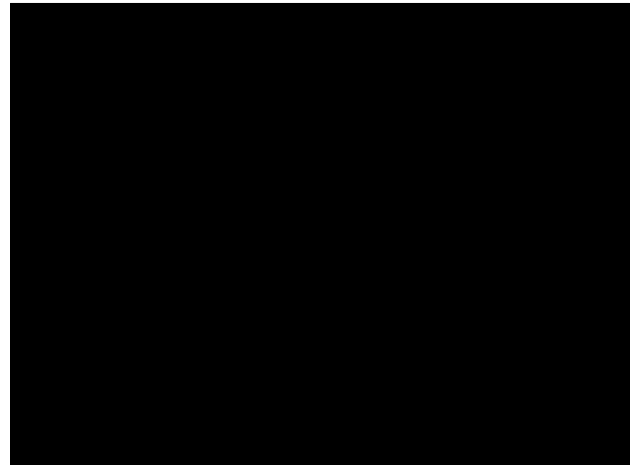
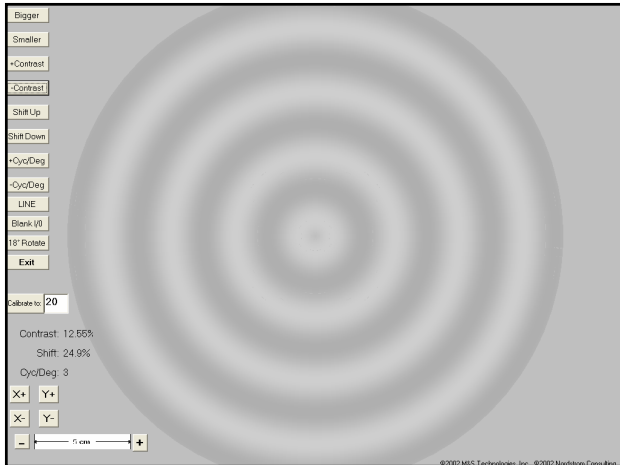
Modified from: Ginsburg A. Spatial filtering and vision: implications for normal and abnormal vision. In: Proenza L, Enock J, Jampolsky A, eds. Clinical Applications of Visual Psychophysics (1981) Cambridge, University Press 70-106.

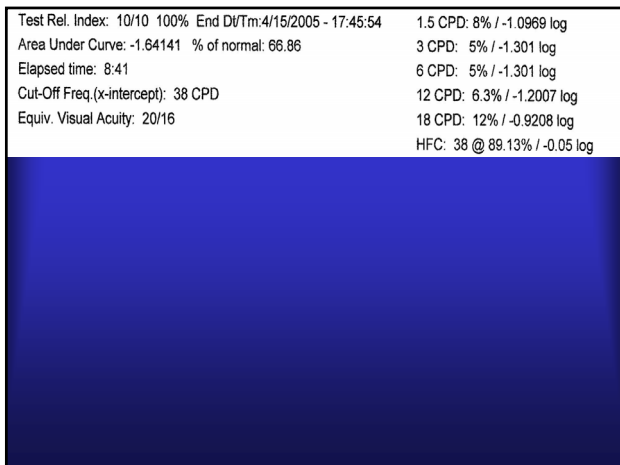
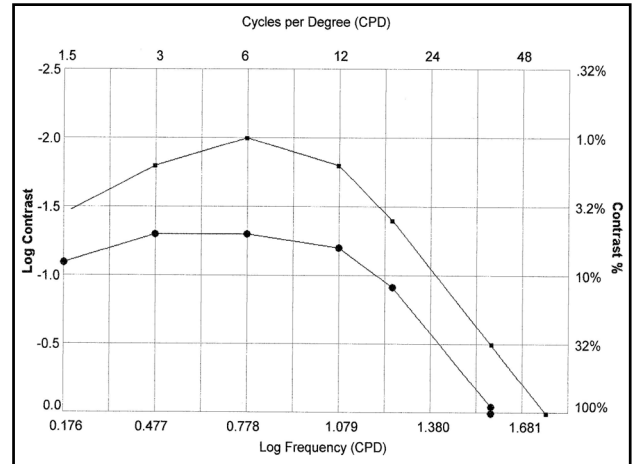
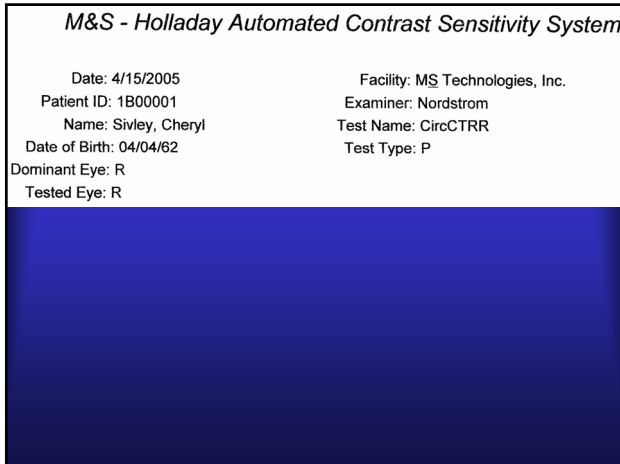
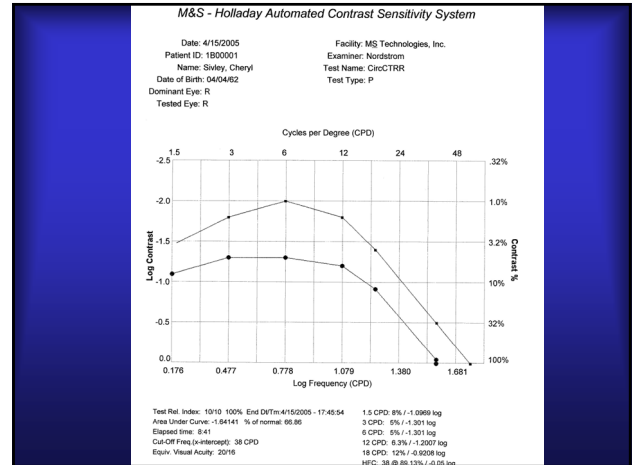
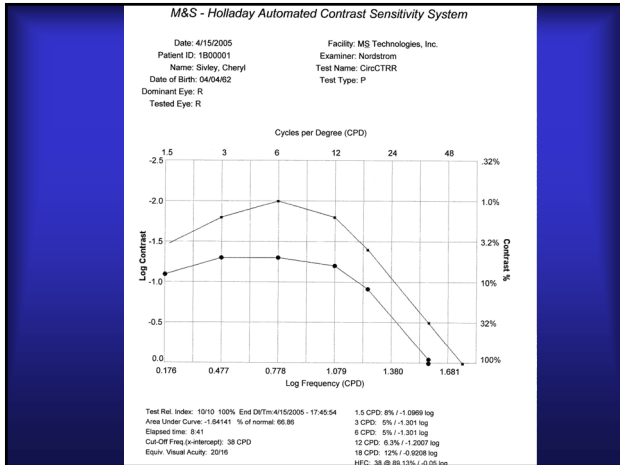
Sine-wave gratings are used to create and test the contrast sensitivity curve. A sine-wave grating is a repeated number of fuzzy dark and light bars or cycles. The number of cycles of a grating over a specified visual angle determines its spatial frequency. A small number of cycles over a specified visual angle is called low spatial frequencies. A large number of cycles over the same visual angle is called high spatial frequencies. Contrast is the difference between the brightness and darkness of the grating. Mathematically it is defined by $c = \frac{I_{max} - I_{min}}{I_{max} + I_{min}}$.

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