

Visual Skills
Program 12

Pilot Vision Tests

Instruction Manual

Keystone View

5725/735-407

FOREWORD

The Keystone Telebinocular Visual Test Unit was developed because of careful research. The Telebinocular instrument and the tests were designed in cooperation with the Special Projects Division, Medical Department, of the Civil Aeronautics Administration. The tests are acceptable to the Federal Aviation Administration for testing the following:

1. Visual acuity, far point.
2. Vertical phoria
3. Lateral phoria.
4. Color Vision
5. Near point vision

The use of Pilot Vision Tests for the visual functions listed above eliminates:

1. The need for a 20-foot space.
2. Special lighting arrangement
3. The need for rotary or loose prisms.
4. The need for a trial frame.
5. The need for spherical trial lenses.

By using the Pilot Vision Tests you can:

1. Save time in giving the required tests.
2. Simplify your examination procedure.
3. Use a standardized examination technique. Detailed instructions for giving each test are provided.
4. Reduce the amount of office space necessary for vision tests. The instrument requires only a 10" X 15" space on a table or stand.
5. Use the same equipment for screening your regular patients, thereby obtaining additional diagnostic data when you desire it.

General Instruction

Care should be taken that:

1. The Telebinocular is adjusted to the eye level of the examinee.
2. Extraneous light is excluded.
3. The test card is free from glare.
4. All test cards are in the cardholder at all times.
5. The cardholder is at the exact position that is indicated for each test distance.
6. The test card is level in the holder.
7. The Telebinocular lenses are always clean.

The examiner should be careful to:

1. Ascertain whether fusion is present initially.
2. State question clearly.
3. Check reliability
4. Record scores correctly.

DESCRIPTION OF THE VISUAL SURVEY TELEBINOCULAR

Lens System

+5.00 diopter spheres, corrected for spherical aberrations.

Lens Separation for All Tests

No adjustment for examinee's PD is necessary.

Light Source

A long-filament light bulb housed in a reflector. Reflected illumination approximately 20 foot-candles.

Testing Positions of Cardholder

Near and far point settings are made at the factory. The cardholder in the extreme back position is set at far point. The cardholder in the extreme front position is set at near point.

Occluders are attached to head of the instrument.

Section I

Tests Required for Items 50,51,55 on Form FAA 8500

Distant Vision Test

Card No. 1, Visual Acuity
Record on Item 50—FAA—8500
Telebinocular Cardholder Set at Far Position

Instruction for Giving the Far-Point Visual Acuity Test

Card No. 1

Test the right eye first. Close occluder on left lens.

Adjust the instrument to comfortable height for examinee. Do not allow him/her to stretch his/her neck or hunch his/her shoulder to see through the center of the lens.

If the examinee is wearing glasses, have him/her remove them and take the uncorrected findings first. Then have him/her replace his/her glasses and take findings through his/her correction.

The test card is composed of broken rings of varying sizes. Correct response is given when the examinee can identify the "break," or "gap," as "right," "left," "top," or "bottom."

The top line has a value of 20/200. It may be used for giving instructions.

Point to the left-hand ring, Line 1, and say, "Do you see the break (gap) to the left?" Then, pointing to the second one, "The break is at the top;" third one, "The break is at the bottom;" fourth, "The break is to the right."

Then to save time say, "Tell me the locations of the breaks in Line 9, left-hand group." If correct, go on to Line 10 and then Line 12, 13, or 14.

If the breaks are correctly located in Line 12, 13, or 14 (all are the same size), record 20/15, since 20/15 is the value of these rings.

Now assume that the examinee gets four correct in the first block of five on Line 7, but less than four correct in the first block of five on Line 8. He/she passes at 20/40, but fails at 20/30. His/her score should be recorded as 20/40. These are alternate groups of targets at each level, and for reliability of measurement, additional groups of five targets may be used.

Locations and Values of Acuity Test Rings

20/200	1.	L-U-D-R	(Left, Up, Down, Right)		
20/100	2.	L-D-R-L-U-U-R			
20/70	3.	U-L-R-L		D-U-R-D (4 correct either	
section—pass)					
20/60	4.	U-L-D-L-R		L-D-R-U-U	
20/50	5.	U-L-R-L-D		U-R-D-R-L	
20/40	6.	U-R-U-L-D		D-U-R-U-L	
20/40	7.	L-U-U-D-R		R-L-D-U-L	
20/30	8.	L-R-U-L-R		D-L-R-R-U	U-L-D-R-U
20/30	9.	D-L-U-R-U		R-D-U-D-U	R-R-U-L-D
20/20	10.	D-R-U-U-L		D-R-L-U-L	D-U-L-U-R
20/20	11.	L-R-R-U-D		R-L-U-D-U	U-D-L-R-R
20/15	12.	D-U-R-D-L		U-U-L-R-D	D-U-L-U-R
20/15	13.	L-U-U-R-D		D-U-L-D-R	L-D-U-R-D
20/15	14.	U-R-D-L-L		D-R-U-U-L	U-L-D-L-R

The examiner should be careful to:

1. Observe examinee's face to detect squinting.
2. Occlude the eye not under test.
3. Employ different blocks of symbols for the left eye than those used for the right eye.
4. Read the score correctly.
5. Record the maximum acuity obtainable.
6. Obtain corrected acuity finding if the examinee wears glasses.

HETEROPHORIA TESTS

Card No. 2, Lateral (Horizontal) Phoria
Card No.3, Vertical Phoria
Record on Item 55—Form FAA 8500

Lateral Phoria Test—Card No. 2

The lateral phoria test as far position indicates the position of the visual axes when fusion is not present and accommodation is at rest. If over convergence exists, the condition is called esoforia, and the finding is recorded after "Esoforia" on Line 55; if under convergence exists, the condition is called exoforia, and the finding is recorded after "Exoforia" on the form. If the finding is at zero or between zero and one, the condition is orthophoria and no record needs to be made.

The test on the Telebinocular is made at the equivalent of 6 meters, and this should be indicated on the record form.

Instructions for Giving the Lateral Phoria Test

1. Set the cardholder at far position.
2. Do not occlude—both eyes must see.
3. Ask examinee, "Do you see a yellow line and also some numbers?" If the answer is "Yes," then say "Tell me what number the yellow line passes through—or is it between two numbers?" If the line wavers, allow time for it to settle down.

When the examinee responds, for example, "It crosses the 4 or is between the 4 and 5," ask, "Does it cross the red or the green line?"

NOTE: If suppression is encountered determine which eye is suppressing and briefly occlude the opposite eye until the suppressing eyes sees the image. Usually both eyes will then be used simultaneously. If this does not occur, the possibility of lack of ability to obtain bifoveal fixation must be considered. Such cases will be referred to a competent specialist for evaluation.

If it crosses the red line, esophoria (over convergence) is indicated. Record number crossed after "Esoforia" on the record form. If it crosses, the green line exoforia (under convergence) is shown. Record after "Exoforia" on the record form.

CAUTION: If the line does not remain steady, regardless of the amount of time you allow, score properly after "Exophoria" or "Esophoria" but indicate limits of swing, i.e., Esophoria 4-7.

Vertical Phoria Test—Hyperphoria—Card No. 3

This test indicates whether one eye perceives images higher than the other does. The card is designed so that one eye sees the line of dots, and the other eye, the scale. The measurement is to find out where the horizontal line of dots crosses the scale.

Instructions for Giving the Vertical Phoria Test:

1. Set the cardholder at far point
2. Do not occlude. Both eyes must be seeing.
3. Ask examinee, "Do you see a horizontal line of dots, and a scale with some numbers?" If the answer is "Yes," say, "Tell me where the line of dots crosses the scale. Does it hit some number or is it between two numbers?"

The vast majority of people will see the line of dots very close to zero on the scale. However, if the line of dots does not cross the zero, find out where it crosses.

Recording is on Line 55 after Right H or Left H. Right H means "right" hyperphoria. If the line of dots is above zero, the recording should be after Right H. If the line of dots is below zero, "left" hyperphoria is indicated, and the recording should be after Left H on the form.

Since a large percentage will show orthophoria—near zero, it would be well to make a check mark or write negative to indicate test was made.

Revised Hetrophoria Tests-Mid 1976

Card FAA-2A, Lateral Phoria
Card FAA-3A, Vertical Phoria
Record Item 55, Form FAA 8500

If you arcquired your Pilot Vision Test Set after mid-1976, it may include the revised phoria tests #FAA-2A and FAA-3A. These cards are designed to insure an honest response from the subject. If your test set does not include these tests, they may be ordered from Keystone.

Lateral Phoria Test-Card FAA-2A

The instructions for this test are identical in theory with that of Test 2, with the following exceptions: Instead of having the Orthophoria (no phoria present) point labeled 'zero', as on Test 2, it is given the number 25. The condition of Esophoria exist if the subject reports a reading below

25, the condition of Exophoria exists if the reading is above 25. The numerical units are prism diopters (Δ d.), therefore, to determine the amount of phoria present, conversion can be made by the use of the following formula:

- 1) $|R-25| = \Delta$ d. of phoria, where R is the reading report.
- 2) If R is less than twenty-five then Esophoria is indicated
- 3) If R is greater than twenty-five then Exophoria is indicated

For example: If your patient reports a reading of 27, a condition of Exoforia is indicated (27 is greater than 25) in the amount of 2 prism diopters ($|27-25|=2$).

Vertical Phoria Test—Hyperphoria—Card No. FAA-3A

The instructions for test FAA-3A are identical to that for test FAA-3 with the exception that the point of Orthophoria has been changed from 'zero' to a reading of 12. Reading in the numerical range below twelve, i.e., from one up to but not including twelve, indicate a condition of Right Hyperphoria, and should be recorded on line 55 after Right H. Readings above 12, i.e., 16 or 20, indicate the conditions of Left Hyperphoria are recorded after Left H on Line 55. As in test FAA-2A, the units on test FAA-3A are also prism diopters. Conversion of the actual reading (R) can be made according to the following formula:

- 1) $|R-12| = \Delta$ d. Of Hyperphoria, where R = numerical reading reported.
- 2) If R is less than twelve, numerically, then Right H is indicated.
- 3) If R is greater than twelve, numerically, then Left H is indicated.

For example: If your patient reports a reading of 9 on this test, Right H is indicated (i.e. 9 is less than 12) in the amount of 3 prism diopters ($|9-12|=3$).

COLOR VISION Test for Severe Color Deficiency

Card No. 4

Question: "Do you see three circles?"

"Tell me the number in each circle. Top? Lower left? Lower right?"

Card No. 4 is a test for severe color deficiency. If the individual cannot quickly and easily give the numbers in two of the three circles, he/she may be considered severely color deficient.

Test for Mild Color Deficiency

Card No. 5

Question: "Tell me the number in each circle. Top? Lower left? Lower right?"

Card No. 5 is a test for mild color deficiency. If the previous test for severe color deficiency is passed but only one or none of the numbers are correctly identified on Card No. 5 (mild), the individual may be considered mildly color deficient.

Record the test used (Keystone), and the number of plates (circles) missed, under line 53.

NEAR VISION TEST

Card No. 6

Record on Item 51—Form FAA 8500-9
Cardholder Set at Near Point

Instructions for Giving the Near Vision Test

1. Place Card No. 6 in the holder set at Near Point. There must be no glare on the test card from extraneous light.
2. "Read what is says in No. 7." If he/she reads all three lines, you know he/she has 20/20 vision in one eye or both eyes.

To measure the amount of acuity in each eye, occlude one eye and ask him/her to read the letters in Line 4, Column A. Point to the block. Then Line 5. Finally Line 6. If he/she reads Line 6, he/she has 20/20 vision in the seeing eye. Occlude the other eye. Then ask him/her to read Line 6 in Column B. If he/she does, he/she has 20/20 vision in the seeing eye. If he/she can't read Line 6, go back to Lines 5, 4, etc. The Key Card enables you to follow responses and to score. Record in Snellen equivalent. These are valid only under occlusion.

SUMMARY

TELEBINOCULAR TESTS REQUIRED FOR FORM FAA 8500

Visual Acuity, Far Point. Cardholder Set at Far Position—Card No. 1

Locations and Values of Acuity Test Rings

20/200	1.	L-U-D-R	(Left, Up, Down, Right)		
20/100	2.	L-D-R-L-U-U-R			
20/70	3.	U-L-R-L		D-U-R-D	(4 correct either section—pass)
20/60	4.	U-L-D-L-R		L-D-R-U-U	
20/50	5.	U-L-R-L-D		U-R-D-R-L	
20/40	6.	U-R-U-L-D		D-U-R-U-L	
20/40	7.	L-U-U-D-R		R-L-D-U-L	
20/30	8.	L-R-U-L-R		D-L-R-R-U	U-L-D-R-U
20/30	9.	D-L-U-R-U		R-D-U-D-U	R-R-U-L-D
20/20	10.	D-R-U-U-L		D-R-L-U-L	D-U-L-U-R
20/20	11.	L-R-R-U-D		R-L-U-D-U	U-D-L-R-R
20/15	12.	D-U-R-D-L		U-U-L-R-D	L-U-R-D-U
20/15	13.	L-U-U-R-D		D-U-L-D-R	L-D-U-R-D
20/15	14.	U-R-D-L-L		D-R-U-U-L	U-L-D-L-R

Record Section 50—Form 8500

Lateral Phoria—Far Point—Card No.2

1. Numbers are prism diopters
2. Red line—ESOPHORIA
3. Green line—EXOPHORIA
4. Record Section 55—Form 8500

Vertical Phoria—Far Point—Card No. 3

1. Scale numbers are prism diopters.
2. If line of dots above zero—right hyperphoria (Right H)
3. If line of dots below zero—left hyperphoria (Left H)
4. Record Section 55—Form 8500

Lateral Phoria—Far Point—Card No.2A

1. Units are prism diopters, R-25 =amount of phoria
2. Reading (R) below 25—EXOPHORIA
3. R above 25—EXOPHORIA
4. Orthophoria =25
5. Record Section 55—form 8500

Vertical Phoria—Far Point—Card No. 3A

1. Units are prism diopters; R-25 =amount of phoria
2. Reading (R) less than 12—right hyperphoria (RIGHT H)
3. R greater than 12—left hyperphoria (LEFT H)
4. Orthophoria—R=12
5. Record Section 55—form 8500

Severe Color Deficiency

Card No. 4

1. 32 79 23
2. Failure to call numbers in two out of three circles correctly indicates severe color deficiency.
3. Record Section 53—form 8500

Mild Color Deficiency

Card No. 5

1. 63 92 56
2. Failure to call numbers in two out of three circles correctly, indicates mild color deficiency.
3. Record Section 53—form 8500

Near Vision- Set Cardholder at Near Point-Card No. 6

1. Score is smallest line examinee can read.
2. Values: 20/100-20/60-20/50-20/40-20/30-20/20
3. Record Section 51—form 8500

Snellen Values Eyes	A-Left Eye	B-Right Eye	C-Both
1. 20/100	L P E	E D L	P E D
2. 20/60	C F D P E	F D P E C	P E C F D
3. 20/50	L O P Z D	E L O Z D	F E L O P
4. 20/40	P Z E O L	E P L Z O	L F E P O
5. 20/30	E D F C Z	Z P D F C	D F C Z P
6. 20/20	D F C Z P	Z P D F C	E D F C Z
7. Top Line 20/40 Middle Line 20/30 Bottom Line 20/20	Good Vision is important to general health as well as safety and job performance		

Keycard Sloan Acuity (Intermediate Acuity 32") Card No. 7

Line	Acuity	Column A	Column B	Column C	Acuity
		Left Eye	Right Eye	Both Eyes	
1	20/200	H	V	N	6/60
2	20/100	NSH	VZO	OND	6/30
3	20/70	ZORHS	CVNOZ	SDCRH	6/21
4	20/50	RHVZN	VHCSZ	NDRVZ	6/15
5	20/40	VNSCH	NOHSR	VCNZO	6/12
6	20/30	DVOZS	VCDNO	DCVZO	6/9
7	20/25	RSDCVNO	DVOZSRH	CDNOSCH	6/7.5
8	20/20	OZSDVCN	CVNORHS	DSCHVZN	6/6
9	20/17	SCHODRZ	CNDVOZS	DVCNZOR	6/5
10	20/15	VZONSHIR	DCVNOZH	DNOHSRZ	6/4.5

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Keystone Perimeter Test

This unique device attaches directly to the Telebinocular instrument and is used to measure lateral peripheral (side) vision. It will indicate if a person is handicapped by "tunnel vision", making it useful in driver education.

Both nasal and temporal readings may be taken. A *temporal* reading measures peripheral vision to the outside: For the right eye, for instance, it indicates how far to the right his/her visual field extends when the subject looks straight ahead. A *nasal* reading measures the width of the visual field to the inside...across the nose. Most school and driver examination are limited to temporal readings.

Preparation for testing

The test subject is seated in front of the Telebinocular. He/she should sit erect, observing the rules of posture outlined on page 6. His/her forehead should lightly touch the *forehead rest of the Perimeter*.

The examiner stands in front of the instrument, facing the subject. He/she directs the subject to fix his/her eyes on the fixation point and to maintain this posture. (The subject's eyes should be watched during tests to make sure the fixation is not broken.) The examiner should firmly grasp the control knob so the target can be turned without arm movement clues being given to the subject.

Test procedure

Instruct the subject: "Place your forehead against this rest and look directly at this white button. Do not move your eyes from this point. When you see the target swing into view from either side, say 'Stop' immediately."

Swing the target behind the subject's head, out of range of his/her vision. Then slowly advance the target to the right or left until the subject first detects its presence and says, "Stop". Note the dial reading.

For greater reliability, repeat the procedure until at least three trials have been given for each eye. Average the readings to obtain the subject's score for each eye. If the subject moves his/her eyes from the fixation point during a trial, disregard the reading on that trial.

If a measurement of nasal field is desired, have the subject hold a card over the eye not being tested. Then swing the target into his/her line of vision from the nasal side, taking the average of three trials.

Interpretation

A person with normal lateral vision will be able to see a moving object when it is 90°-or at a right angle- to his/her eye on the temporal side.

No exact standards have been developed which show the point where the diminution of lateral fields has an effect on accidents. However, authorities state that a field more restricted than 60° would be a serious danger to the operator of a vehicle. A temporal reading of 75° should be considered the minimum standard for safety.

When a student shows a severely restricted field, it is suggested that his/her parents be notified...and the probable need for a professional eye examination be explained to them.

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