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Development and Implementation of a Rear Vision Device Test Protocol, Volume II, Simulated-Use Testing

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16. Abstract

A standardized method for evaluating rear vision devices was developed and implemented. The method consists of the 1) measurement of device physical characteristics including; field of view, magnification, radius of curvature, accommodation demands and reflectance and 2) measurement of simulated-use performance including distance and lane position and motion judgment. Volume I describes the physical characteristics measurement protocol and results for several devices including plane, convex and non-spherical rear view mirrors. Volume II describes the simulated-use protocol and summarizes preliminary simulated-use performance for those measures. Relations between physical characteristics and user performance measures are discussed.

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1.0 BACKGROUND AND ORGANIZATION

1.1 Purpose and Background

Over the past 20 years there have been numerous theoretical and experimental attempts to study and evaluate rear vision device effectiveness for motor vehicle driving. Empirical studies, both in the laboratory and on-the-road, have employed various performance measures to investigate mirror design parameters such as Field of View, Radius of Curvature, magnification, combinations of mirrors and parameters attempting to determine which devices or systems are better than others. Evaluation measures included user 1) looking behavior, 2) gap acceptance, 3) distance judgement error, 4) lane change decision time and accuracy, 5) eye movements, and 6) critical incident frequency.

The numerous studies have shown differences among rear vision devices and systems. Devices have been shown to differ to a greater or lesser degree on most of the above performance measures. Some mirrors required more glances and/or longer glances for decisions; other mirrors required different gap acceptance distances. Also, performance measures varied as a function of distance to the target vehicle(s) being observed. More glances were required for judgements regarding target vehicles at greater distances and distance judgement errors varied as function of target distance. In addition, some larger FOV mirrors allow higher detection frequency at near distances but poorer judgement of distance at long distances to the rear.

Attempts to integrate such data from independent studies, each employing different methodologies, observers, rear vision systems and performance measures, presents a formidable and perhaps impossible task. Debate continues with respect to the relative effectiveness of plane, convex, plane/convex combinations, non-spherical curved and periscope rear vision systems. The need for a method which integrates the various salient performance measures into a single comprehensive Figure of Merit, assessing the overall effectiveness of a rear vision system, is clearly indicated.

1.2 Overview

This study report, Volume II, describes the development and implementation of a standardized, simulated-use performance measurement/evaluation approach for rear vision systems. A companion report, Volume I, describes a standardized approach to the measurement/evaluation of rear view mirror physical characteristics, including Field of View, Magnification, Reflectance, Surface Curvature and Accommodation Distance.

1.3 Organization of the Report

Chapter I outlines the technical report, summarizing the major elements of Sections 2.0 through 5.0.

Section 2.0 describes the conceptual development of the simulated-use performance measurement/evaluation approach including trade-offs among various alternatives which led ultimately to the evaluation concept selected and described in detail in Section 4.0.

Section 3.0 describes three major test development sessions which were conducted to evaluate empirically various alternative implementations of the original concept. These three sessions evaluated stimulus material quality, test protocol, data management and analysis, effects of training/practice on performance, night viewing condition simulations, image complexity, rain simulation and other concepts. Also described in Section 3.0 are results supporting methodological refinements and preliminary results indicating the range of variables which can be explored by the simulated-use measurement/evaluation approach.

Section 4.0 presents the simulated-use measurement and evaluation test protocol in sufficient detail so the tests can be replicated by other test laboratories. Due to the complexity of the protocol, however, considerable background is required by other users.

Section 5.0 summarizes conclusions and recommendations growing out of the development and application of the approach. Preliminary results are presented regarding side rear view mirror performance. Also, recommendations for upgrading the equipment developed here are made and the question of simulated-use test validity is addressed.

Following Section 6.0, References, Appendices A-K are presented. These are summarized below:

Appendix A describes slide stimulus preparation.

Appendices B, C and D, respectively, present detailed performance results for test Sessions I-III.

Appendices E, F and G define the stimulus slides and slide trays used in tests.

Appendix H briefly describes the rain simulation requirements and operations.

Appendix I describes computer, slide projector and response panel interfaces and operation.

Appendix J presents the computer program for automatic slide tray operation.

Appendix K presents subject instructions.

2.0 SIMULATED-USE EVALUATION CONCEPT DEVELOPMENT

2.1 Introduction

This chapter describes the need for a standardized uniform procedure for the measurement and evaluation of rear vision systems and summarizes the more important decisions and trade-offs made in development of the simulated-use concept and test method.

2.2 Logical Development of the Figure of Merit

2.2.1 Requirements

The purpose of a rear-vision system is to serve as a display of information regarding "events" to the side/rear of one's own vehicle. The events are primarily other vehicles and their locations and movements (defined as target vehicles). The rear vision device user must be able to detect a target, identify and locate it and then determine its movement pattern. A system can be deemed effective if it adequately satisfies all of these driver needs. These requirements led to the concept which was further refined as described below.

2.2.2 Simulated-Use Concept

The simulated-use test procedure to be developed then requires a sample of observers in a vehicle or mock-up representing typical vehicle viewing geometries. Such observers are to employ a rear vision system under test to estimate the position and motion of actual or simulated vehicles to the rear. Measures are to be made of user performance in locating the position and determining the relative motion of vehicles in the rear scene. Performance measures are to be ultimately weighted and combined into a single over all score indicative of a system's performance over all relevant conditions.

A simulation test concept emerged early in the development since the alternative--on-road testing using actual vehicles--clearly would be too costly and would involve too great a risk to life and property.

2.2.3 Simulated Use Test Concept Overview

The simulated-use concept which served as a starting point is summarized below.

Subjects (or mirror users) were seated in an indoor vehicle mock-up having dimensions representative of a typical subcompact vehicle. While seated in the mock-up, they viewed 35mm color slides of target vehicles located at

various distances and lane locations to the rear. Each slide was projected for one-second on a screen behind the mock-up. Subsequent to various amounts of practice/training, they were required to make a series of judgements regarding 1) the distance and location (lane) of a target vehicle and 2) the motion of a target vehicle, simulated by successive slides of the target in which it is closing, receding or maintaining the same distance. Distance, location and direction of motion errors, as well as the number of looks needed to assess motion, were measured. Position and Motion errors were weighted and combined into a score for each lane/distance. Finally, the scores were cumulated over all lanes and distances to obtain an overall Figure of Merit (FOM) performance score for all subjects and conditions for each device tested.

The basic concept, was refined and modified as a result of the three major development test sessions described in Chapter 3.0.

2.2.4 The Test Facility Concept

Dimensions typical of a compact vehicle were determined and a simple vehicle mock-up was constructed. The mock-up consisted of a platform (establishing ground level) on which various hardware was mounted for quickly attaching mirrors in various locations. The platform was calibrated in x, y and z to permit quick and precise location of mirror position, eye position and projected images of target vehicles to be observed. A projection system (screen and projector) was developed to project target vehicle images at the rear of the mock-up. Projection/viewing geometry was calibrated to present targets in approximate proper size scale and position relative to the mirror/user.

2.2.5 Simulation Trade-offs

Design of the simulated-use test method and protocol required a number of design trade-offs. The primary decisions involved:

1. time vs error performance measurements;
2. secondary forward loading task;
3. stimulus generation methods; and
4. discrete vs continuous motion.

2.2.5.1 Time vs Error Trade-off

Classical measures of visual/system performance involve measurement of time, error or both. Performance task time can be restricted or limited to a brief exposure period wherein the primary measure becomes error frequency or

magnitude. Alternatively, performance time can be unrestricted, generally resulting in few errors, with performance time being the primary variable measured.

The driving task does not permit unlimited rear vision device use-time. Many previous studies have shown that on-road driving results in time allocated to rear vision systems of about one second (Burger, et. al., 1980). That is, drivers are willing to look at a mirror, diverting attention from forward viewing, for about one second. Thus, a one second exposure was selected for viewing target vehicles via the rear vision system for the simulated-use test.

2.2.5.2 Secondary Forward Loading Task

In order to enhance simulation fidelity, a secondary task is often used to divide an observer's attention.

Quite relevant secondary tasks in which the observer follows another vehicle and responds to brake signals or tracks roadway curvature were rejected for two reasons. First, experience from previous studies involving simulation of mirror use tasks has shown that subjects quickly learn which performance task is of primary interest to the study and simply relegate little attention to the secondary task in order to maximize performance on the primary mirror task. Second, individual variability is very wide and contributes to large variances in the data for both tasks. Consider the possible finding where Mirror A results in good primary task performance but poor secondary task performance, while Mirror B results in the opposite performance. The question simply cannot be answered as to which mirror is actually more effective than the other unless performance on the secondary task is the same for all mirrors tested. A secondary forward loading task was not employed for those reasons.

2.2.5.3 Stimulus Generation

The simulated-use concept required a large number of stimuli (35mm slides of vehicles located in various lanes and at various distances to the rear) to be viewed by a rear vision system user. Both single and multiple vehicle stimuli during the day and at night were desired. In order to generate a large number of stimuli rather quickly, eliminate extraneous background cues, and maintain constant illumination, a 1/25 scale model board was used. The method for generating stimulus slides is described in detail in Appendix A.

Briefly, slides were made of a single target vehicle at 1/2 car length intervals in both adjacent and far lanes from 0-

14 car lengths to the rear for each mirror viewing position (left, center and right). The process was repeated for the multiple target slides for all lanes and distances with a target vehicle embedded among 3 other vehicles. The process was again replicated for night viewing conditions. Simulated-use tests were developed using sub-sets of the total number of test slides available.

2.2.5.4 Discrete vs Continuous Motion

The movement of an object can be discerned by continuously observing its change in position or size over time or motion can be observed through discrete observations of the result of such changes over time. The latter approach was selected because of practical reasons. In the driving task, observers typically allocate about one second to a mirror look. During that period motion often cannot be observed directly unless the relative motion is substantial. Multiple discrete observations of lower rates of motion appeared preferable. Thus, the task requires an observer to view, for one second durations, successive slides wherein the threat vehicle is either closing, receding or maintaining distance in one-half car length intervals.

Continuous motion, ie motion pictures could be developed, however, at considerable cost. Since the payoff in terms of increased discrimination among mirror system performance is probably small, but presently unknown, the cost of developing and implementing a continuous motion sub-test should be considered carefully. Measurement of continuous motion Performance may or may not be a valuable refinement of the method developed to date.

2.2.6 The Figure of Merit

In order to determine the position of target vehicles, the device user must be able to accurately determine the distance to the rear and the lane location of the threat vehicle. Also, the user must be able to determine the relative motion of the threat, i.e. is it closing, receding or maintaining the same relative distance. It is also necessary for the user to determine the magnitude of the motion, or relative position change over time.

A rear vision system which permits all users to make perfect and rapid assessments of position and motion would be a perfect system. Given that systems are not perfect, they will therefore vary in terms of producing judgment errors. Moreover, errors will vary with respect to magnitude as well. For example, a user may underestimate or overestimate a threat's distance to the rear. Clearly, the former error is more serious in terms of collision likelihood than the

latter. Also, a user could judge a target to be receding in the far lane when it is actually closing in the adjacent lane. Again, the latter has potentially more serious consequences than the former.

Thus, there is a clear requirement for weighting the frequency and severity of errors in the determination of any overall performance evaluation.

A method for weighting the various position and motion errors was developed. The method weights severe errors more heavily than those judged to be less severe and different weights are assigned, depending on the distance which errors occur. The method for weighting and combining position and motion performance into an overall Figure of Merit (FOM) metric representing total performance is described in detail in Chapter 3.0.

3.0 DEVELOPMENT TESTING SESSIONS

3.1 Introduction

Three major development test sessions were used to develop and refine the protocol and to provide preliminary measures of simulated use performance for selected mirrors. In addition, numerous informal test sessions were conducted to develop and select target vehicle stimuli, estimate training requirements, evaluate protocol and so forth.

The three major development sessions all involved preliminary variations of the final test protocol presented in Chapter 4.0 and they served as the basis for final protocol development. The principal methodological findings which served to modify procedures and method and preliminary performance measures for mirrors are described below. Table 3-1 summarizes the major variables of the three sessions.

Various mirrors were tested in the three session to assure their generality. Mirror characteristics are summarized in Table 3-2.

3.2 DEVELOPMENT SESSION I; BUILDING ON THE BASIC CONCEPT

3.2.1 Issues

Development session I involved evaluation of four mirror types mounted on the left door position (driver-side) of the vehicle mock-up. Single daylight target vehicle stimuli were used and position and motion performance was measured for 12 mirror users. The purpose was to evaluate stimuli, procedures, measurement and data analysis concepts.

3.2.2 Mirrors

Four left side mirrors were tested in Session I. They are identified below while specific mirror characteristics are described in Table 3-2.

1. Plane
2. 40 inch ROC Convex
3. Non Spherical Curved (V)
4. Non Spherical Curved (Z), Cylindrical

3.2.3 Subjects

Twelve subjects served as mirror users in all tests. There were 6 male and 6 female observers, divided equally into 3 age groups; 16-30, 31-45 and 46-60. Corrective lenses were used by those required to do so by the California Department of Vehicles.

TABLE 3.1 SUMMARY OF DEVELOPMENT TEST SESSION I-III VARIABLES

DEVELOPMENT TEST SESSION	MIRROR LOCATION	MIRROR TYPE	CLOSET VISIBLE DISTANCE*	AMBIENT VIEWING CONDITIONS	THREAT VEHICLE TARGETS	NUMBER OF SUBJECTS	PERFORMANCE MEASURES
I	LEFT DOOR	1-PLANE 2-40" CONVEX 3-NON SPHER (V) 4-NON SPHER (Z)	25 11 7 17	DAYLIGHT	SINGLE	6 M 6 F	POSITION LANE ERROR DIR. ERROR DIST. ERROR MOTION DIR. ERROR NO. OF LOOKS
II	RIGHT DOOR	1-PLANE 2-40" CONVEX 3-NON SPHER (V)	63 21 11	DAYLIGHT NIGHT RAIN DRY	SINGLE	2 M 2 F	SAME AS I
III	RIGHT DOOR	1-20" CONVEX 2-NON SPHER (V)	11 11	DAYLIGHT NIGHT	SINGLE MULTIPLE	3 M 3 F	SAME AS I PLUS LEARNING AT 3 LEVELS

* CLOSET DISTANCE (FT.) BEHIND MIRROR AT WHICH PART OF TARGET BECOMES VISIBLE

TABLE 3.2 SUMMARY OF MEASURED MIRROR CHARACTERISTICS

NAME	PLANE	PLANE	40" ROC	40" ROC	"V"	"V"
TYPE	FLAT	FLAT	CURVED	CURVED	CURVED	CURVED
SPEC. CHARACT.	FLAT	FLAT	SPHER	SPHER	NON-SPH	NON-SPH
SIZE (IN.)	4.0 X 6.5	4.0 X 6.5	4.0 X 6.5	4.0 X 6.5	4.0 X 6.5	4.0 X 6.5
MOUNT LOCAT.	LT DOOR	RT DOOR	LT DOOR	RT DOOR	LT DOOR	RT DOOR
FIELD OF VIEW*						
HORIZ.	22.5" (14)**	14" (7)	48" (31)	36" (20)	78" (49)	72" (42)
VERT.	12"	9"	23"	19"	18" - 30"	15" - 22"
MAGNIFICATION						
HORIZ.	1	1	0.43	0.43	.06 - .60	.06 - .60
VERT.	1	1	0.53	0.53	.50 - .65	.50 - .65
RADIUS						
HORIZ.	-	-	37"	37"	6" - 60"	6" - 60"
VERT.	-	-	37"	37"	28" - 71"	28" - 71"
ACCOM. DEMAND			52"	68"	35 - 62"	51 - 78"
REFLECTANCE***	TBD	TBD	TBD	TBD	TBD	TBD

* AT 60" BEHIND MIRROR SURFACE

** APPROXIMATE FOV IN DEGREES

*** NOT MEASURED, SEE 4.6

TABLE 3.2 SUMMARY OF MEASURED MIRROR CHARACTERISTICS (CONTINUED)

NAME	"Z"	"Z"	20" ROC	"K"
TYPE	CURVED	CURVED	CURVED	FLAT/CURV
SPEC. CHAR.	NON-SPH	NON-SPH	SPHER	FLAT/SPHER
SIZE	3.5 X 6.5	3.5 X 6.5	3.6 X 4.4	3.7 X 4.1/ 3.7 X 2.0
MOUNT LOC.	LT DOOR	RT DOOR	RT DOOR	RT DOOR
FIELD OF VIEW*				
HORIZ.	31" (23)	24" (15)	38"	36"
VERT.	11"	9"	27"	36"
MAGNIFICATION**				
HORIZ.	.27 - .98	.27 -.98	0.24	1.0/.13
VERT.	.57 - .94	.57 - .94	0.24	1.0.13
RADIUS				
HORIZ.	30" - FLAT	30" - FLAT	20"	10"
VERT.	37" - FLAT	37" - FLAT	20"	10"
ACCOM. DIST.	47 - 96"	63 - 96"	58"	53"
REFLECTANCE	TBD	TBD	TBD	TBD

3.2.4 Target Vehicle Stimuli

A single target vehicle in daylight and located in each of the left lanes (adjacent and far) and at 11 distances (representing 0-10 car lengths, at one car length intervals) was used as the stimulus for position judgement tests. A single target vehicle, located in each lane and at 29 distances (representing 0-14 car lengths at 1/2 car length intervals), was used for motion tests (See Appendix A).

3.2.5 Procedure

Each subject sat in the mock-up and was given instructions. A mirror was then installed and the subject was given approximately 1 hour of intensive training using pre-cuing and feedback. He was then tested on position and motion tasks. Mirror test order was counterbalanced across subjects, genders and ages. Motion performance was tested first and position second. In all tests, the viewings of targets was limited to a one second exposure.

3.2.6 Motion Performance Measurement

Subsequent to about 1 hour of motion training, which involved viewing successive targets receding or closing from zero to 14 car lengths in each lane, subjects viewed a number of sequences wherein successive views of a single target vehicle indicated that it was either closing, receding or maintaining a constant distance to the rear. On each successive view of a target that was "moving", the vehicle changed distance by 1/2 car length. The initial starting distance was varied randomly from trial to trial. Subjects indicated a closing, receding or non-moving vehicle via a push button panel. A micro-computer controlled stimulus presentations and recorded responses and the number of views f the target needed in order to make a decision.

3.2.7 Position Performance Measurement

Subjects were given about 1 hour of training on viewing targets in various locations to the rear. Following training, they viewed the single target vehicle in the mirror (if visible) and responded verbally with his/her judgement of the 1) distance (in car lengths) and 2) lane position (adjacent or far). Each distance/lane position (0-10, adjacent - far) was presented once in random order. The experimenter manually recorded lane and distance verbal responses.

3.2.8 Data Reduction and Analysis

Response data were entered into a micro-computer which applied the various weights to responses and computed position and motion performance scores for each subject/mirror/distance/lane. Measures were averaged and analyzed in several ways to examine methodological issues and provide preliminary performance data.

3.2.9 Results

3.2.9.1 Methodological Findings

Two major methodological findings evolved. First, the motion performance tests as conducted were extremely time consuming. The simple mechanics of the slide projector traveling to each preselected random start position and presentation of 6 to 20 slides for each judgement resulted in excessive training and testing time. Thus, the motion test procedure was modified and shortened for subsequent development test sessions.

Second, subsequent to considerable use of the mirrors by the staff, it appeared that a night test condition and one involving simulated rainfall on the mirrors and windows would be desirable since these common conditions might differentially affect performance as a function of mirror characteristics.

3.2.9.2 Performance Measures

As noted above, position performance was measured in terms of 1) distance error direction, 2) distance error magnitude and 3) lane error, while motion performance was measured in terms of 1) motion direction error and 2) number of looks to determine motion direction. Selected performance measures, averaged for all 12 subjects, are described below to illustrate the performance of each of the four mirrors tested and to illustrate the need for combining these submeasures into an overall Figure-of-Merit.

3.2.9.3 Distance Judgment Performance

Figure 3-1 illustrates the actual vs judged distance of the single target vehicle during daylight for the adjacent lane for each of the four left door mount mirrors. Mirror users generally tended to judge targets as closer than actual, especially at the greater distances. The non-spherical curved mirrors had larger underestimation errors than the plane or convex mirror. It should also be noted that the convex and

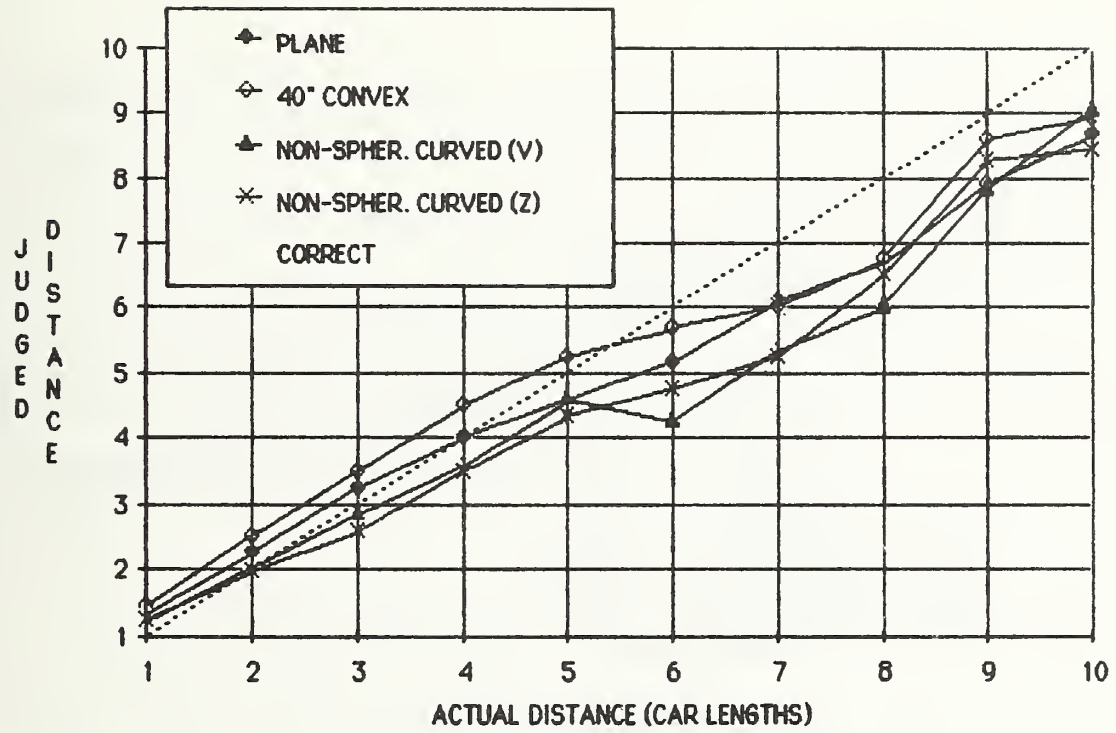


FIGURE 3.1 ACTUAL VS JUDGED DISTANCE FOR FOUR MIRRORS

(LEFT DOOR MOUNT, ADJACENT LEFT LANE)

plane mirror judgements at nearer distances were small (3-6 feet) overestimates. Relatively small average errors (about 1-2 car lengths at 6-10 car length distances) are likely due to the considerable training/practice given for each mirror.

3.2.9.4 Motion Judgement Performance

Looking frequency shown in Figure 3-2 illustrates the number of successive looks at the target vehicle needed to make a decision regarding direction of motion. Generally, more looks were required at greater distances and curved mirrors typically required more looks than the plane mirror. The non-spherical curved (V) mirror typically required the most looks to determine motion direction.

3.2.9.5 Motion Score

Figure 3-3 illustrates the motion score for each mirror at various target vehicle distances. The motion score is the result of weighting 1) motion direction error and 2) number of looks and combining the results (ie., calculating the product of those values). The figure indicates that a higher score is obtained by all mirrors at closer distances and that the plane mirror achieved the highest score generally from 10-3 car lengths distances. At closer distances (ie. less than 3 car lengths) very low motion scores were obtained for the plane mirror since the target vehicle was typically not visible in the mirror FOV.

The non-spherical curved (V) mirror generally had the lowest scores at all distances beyond 3 car lengths.

3.2.10 Overall Mirror Performance

3.2.10.1 Need for Weighting and Combining Sub-measures

As seen above, some mirrors obtained higher scores than others for some target distances to the rear while others obtained higher scores in terms of motion judgement and/or number of mirror looks at various distances. Also, performance for the far lane task resulted in low or zero scores for some mirrors at some distances simply because the target vehicle was only partially visible or not visible at all. Thus, the need for weighting individual performance measures e.g., lane error and number of looks, and combining all measures into an overall score or Figure of Merit (FOM) representing total mirror system performance is apparent.

3.2.10.2 Position Performance Weighting

A subject's response to the position performance simulated-

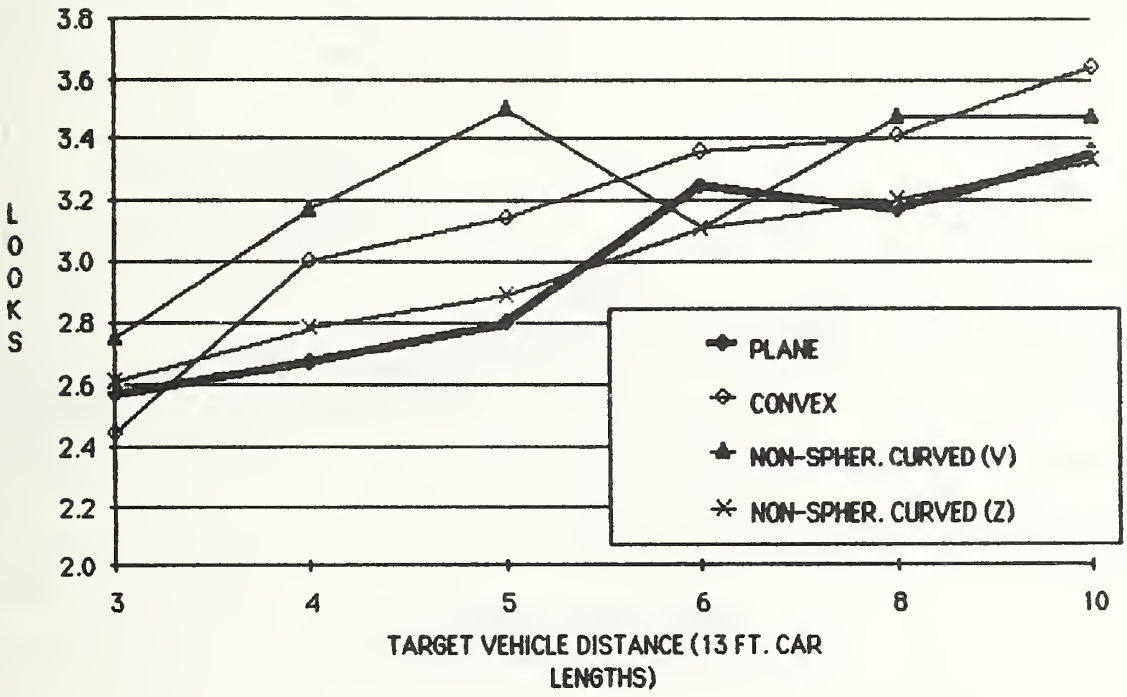


FIGURE 3.2 AVERAGE NUMBER OF LOOKS TO JUDGE MOTION FOR FOUR MIRRORS (ADJACENT LEFT LANE)

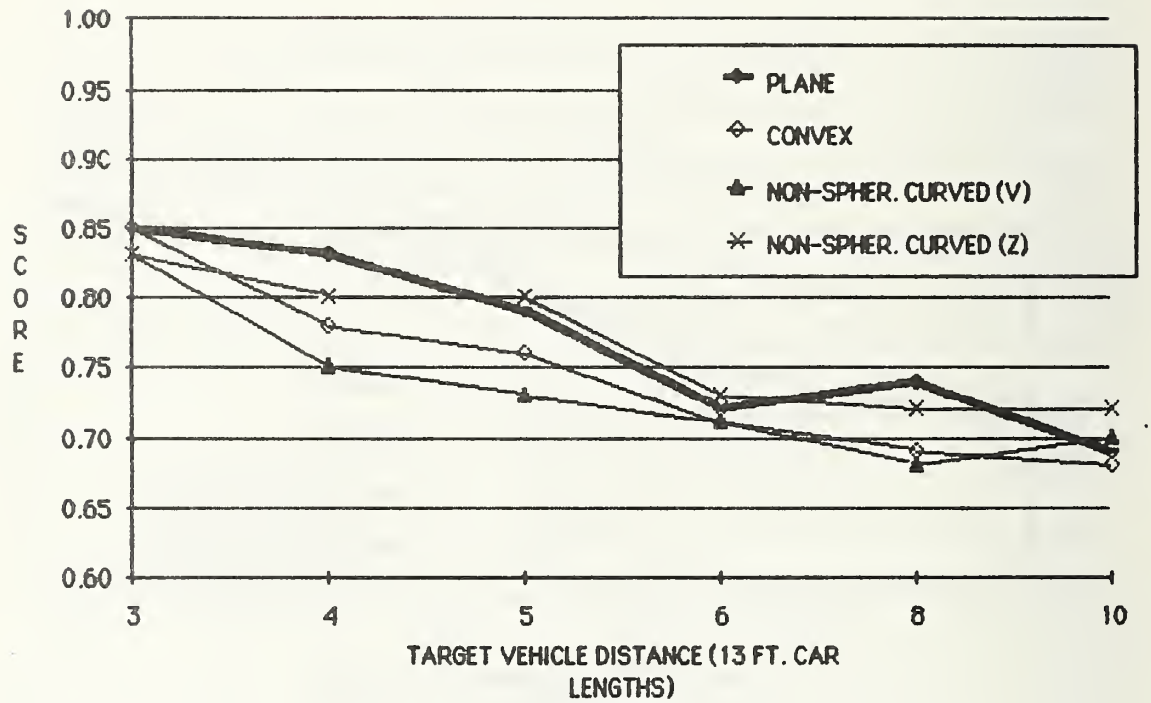


FIGURE 3.3 MOTION SCORE FOR FOUR MIRRORS (NO. OF LOOKS AND MOTION DIRECTION ERROR COMBINED, ADJACENT LEFT LANE)

use tests is comprised of his/her judgement regarding the distance and lane location of a target vehicle. Thus, a judgement can be in error in two possible ways and these also can vary in terms of direction and magnitude. For example, for a "true" target vehicle location of 6 car lengths/far lane a response might be 4 car lengths or 8 car lengths and adjacent lane. Each combination of lane/position error and direction and magnitude of the error is given a weight ranging from 0-1.0. These weights are based upon the judgement of the research staff regarding the severity of the error. The weights are presented below in Table 3-3.

Sample Position Score Computation

Assume the "true" position of a target vehicle is 5 car lengths and is located in the adjacent lane. Also assume that a subject responds with "3 car lengths/far lane". The distance error is 2 car lengths (5-3=2) and the direction of the error is positive (Judged closer than actual). The lane judgement was "far" when it actually was "adjacent". The weights, then, comprising the position score are;

Position Score= Distance Error Weight (.8) x Direction Error Weight (.8) x Lane Error Weight (.25) = .16

3.2.10.3 Motion Performance Weighting

A subject's response to the motion performance simulated-use test can be comprised of 1) an error in the direction of motion, and 2) the number of looks taken to make a judgement regarding motion. Each response is weighted on each measure. The number of looks can range from 2 (the first view plus the second view) leading to a judgement to 8 looks prior to a decision. The weights assigned to direction of motion error and number of looks are shown in Table 3-4. Again, these are based upon the staff judgement regarding the severity of the error.

Sample Motion Performance Score Computation

Assume the true motion of a target vehicle is receding. Assume also that a subject responds that a threat vehicle is maintaining a constant distance and that he requires 6 views of the target vehicle's motion. The weights then, comprising the motion score are;

Weighted Motion Score= Motion Direction Error Weight (.5)x Number of looks Weight (.60)= .30

Table 3-3
Weights Applied to Position Errors(a)

Distance Error Car Length	Weight
0	1.0
1	.9
2	.8
3	.7
4	.6
5	.5
6	.4
7	.3

Direction of Error	Weight
None	1.0
Negative	0.3
Positive	0.8

Lane Position Error Weights(b)

		True Lane Position	
		Adjacent	Far
Judged Lane Position	Adjacent	1.0	.75
	Far	.25	1.0

TABLE 3-4. Motion Direction Error Weights(a)

		Actual Motion Direction		
		Closing	Maintaining	Receding
Judged Motion Direction	Closing	1.0	.75	.50
	Maintaining	.5	1.0	.75
	Receding	.25	.50	1.0

Number of Looks to Decision(b)

Number of Looks	Weight
2	1.0
3	.9
4	.8
5	.7
6	.6
7	.5
8	.4

3.2.10.4 Weighting the Importance of Position and Motion Performance

The actual distance to the rear and the lane position of a target vehicle is obviously a very important consideration and must receive an appropriate weight. A two car length distance error, a positive direction error or a lane judgement error is far more severe if it occurs when the threat vehicle is 1-2 car lengths to the rear than if it occurs 10 car lengths to the rear.

A study conducted by Smith et al. 1978 to determine the relative importance of car length spaces to the sides and rear of one's own vehicle provides a measure of the importance of where errors occur. Briefly, a paired comparison technique was used, with driver education specialists, as well as a sample of the driving public to determine the relative importance of each of 10 car length distances to the rear in each of 5 lanes (2 left, 2 right, 1 behind). The relative importance values were assigned a scale value ranging from 0-100. They are shown below in Table 3-5.

The values for the left and right adjacent lanes are the same as are those for the left and right far lanes, but the latter are about one-half as important at equilvalent distances to the rear. With regard to distance, the values at the closest distances (0-1 car length) are 45-90 times as important as those at 10 car lengths--a car length for purposes here being 13 feet. Thus, for the adjacent lanes, performance at 10 car lengths is given only 1/90th the weight as performance at 0 or 1 car lengths.

Table 3-5. Lane /Distance Importance Weights

Car Length Distance	Far Left	Adj. Left	Center	Adj. Right	Far Right
0	45	90	--	90	45
1	45	90	90	90	45
2	40	75	75	75	40
3	35	55	55	55	35
4	25	45	45	45	25
5	10	30	30	30	10
6	3	20	20	20	3
7	1	5	5	5	0
8	0	5	5	5	0
9	0	3	3	3	0
10	0	1	1	1	0

The Overall Figure of Merit (FOM)

As will be seen later, some rear vision systems exhibit performance superior to other systems at greater distances, i.e., 5-10 car lengths, possibly due to the absence of minification. Others (curved) exhibit performance relatively better at near car lengths distances, i.e., 0-4 car lengths, because of their larger FOV. However, a system needs to perform well at all distances and lanes. If one were to select a rear vision device on the basis of its performance at one distance in a given lane, the process would be simple. But rear vision systems must perform over the range of distances and lanes to have overall effectiveness. The distance/lane importance weights described above provide a method for weighting performance at each target vehicle position. These weighted scores can then be combined over all target vehicle positions to obtain an overall FOM.

3.2.10.5 Calculating the Figure of Merit (FOM)

A rear vision system's overall performance is defined by a FOM. The FOM is calculated by 1) combining the position and motion scores for each distance and lane, 2) weighting these values by the appropriate distance/lane importance weights and 3) summing these weighted total scores for each lane and position. The overall process of calculating the FOM is shown in Table 3-6. Details for calculating the FOM from raw error measures for position and motion are presented in Chapter 4.0.

3.2.10.6 Mirror Performance Summary

Various sub-scores and overall FOM performance scores for each of the four mirrors tested are illustrated in Appendix B. Represented are scores for the left adjacent lane, left far lane and both left lanes combined for each distance of interest from 0-10 car lengths. Performance scores include position and motion and total (the product of position and motion) score. Column 5 illustrates these scores when weighted by the importance of the lane and distance as described in Table 3-5. Finally, this score is cumulated from 10 to 0 car lengths and is presented as the percent of the maximum possible score (FOM). The total FOM for each mirror for adjacent and far lanes and all distances and subjects are shown below for comparison in Table 3-7.

The table indicates that the total overall performance score, or FOM, for all curved mirrors tested is superior to that of the plane mirror over all distances and lanes tested

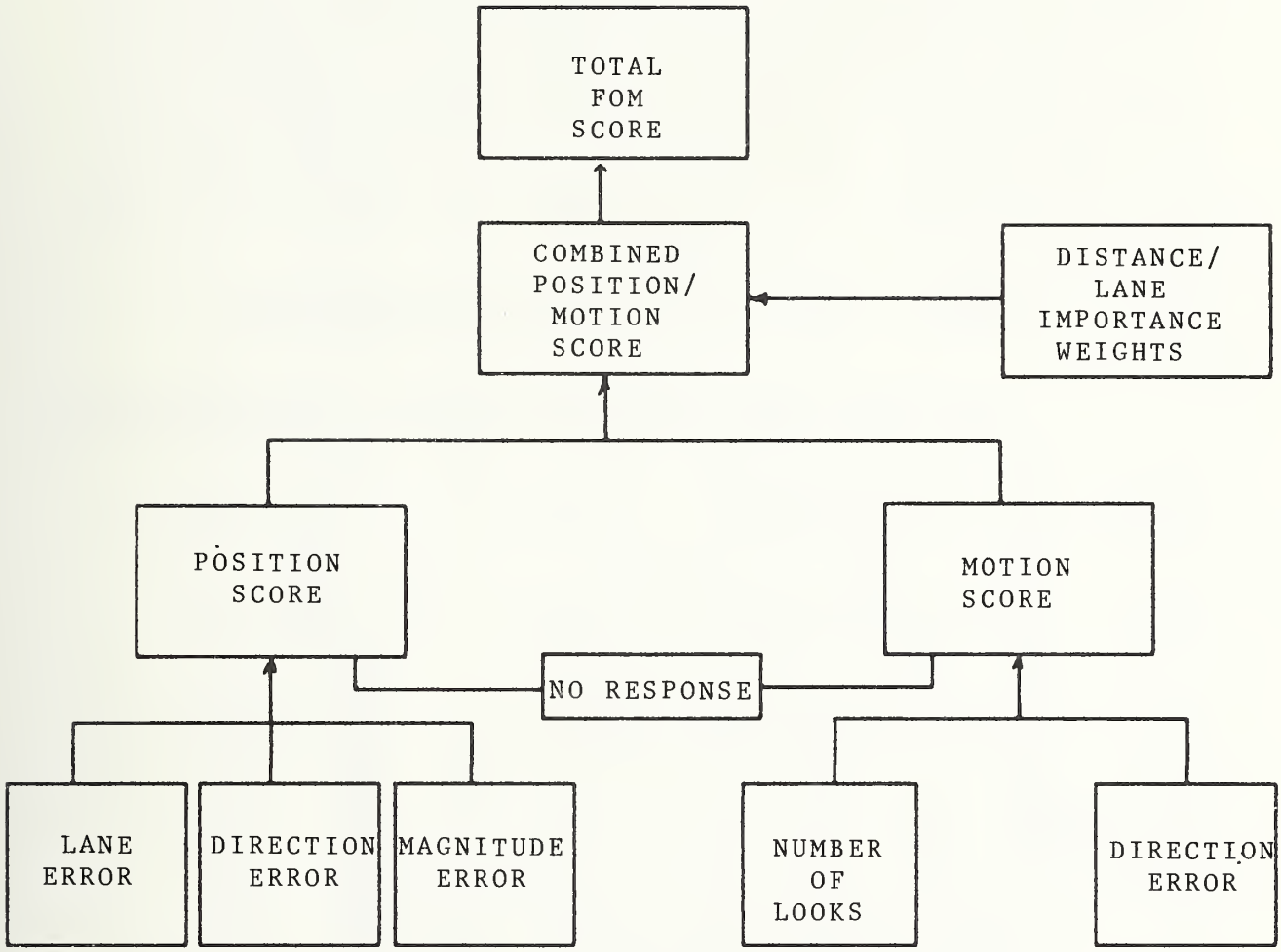


TABLE 3.6
SIMULATED-USE FOM
CALCULATION PROCESS

when weighted by lane and distance importance. The fact that these mirrors showed poorer motion and position performance at greater distances is overcome by the superior performance at near distances where importance is greater.

Figure 3-4 more clearly illustrates the data, presenting for each mirror, the percent of the maximum possible score cumulated from 10 to 1 car length distances for both left lanes. The plane and 40" ROC convex mirrors have substantially higher scores than the non-spherical curved mirrors from 6-10 car lengths. These later mirrors had less severe position and motion errors than the others at these distances. At nearer distances, 4-1 car lengths, the plane mirror score drops substantially because of its small FOV, i.e., target vehicles are simply not visible.

TABLE 3-7 TOTAL FOM BY LANE FOR FOUR MIRRORS

	Plane	40" Convex	Non-Spherical(V)	Non-Spherical(Z)
Left Adjacent Lane	173.41	214.56	255.15	197.67
Left Far Lane	10.62	62.20	78.41	25.91
Both Lanes	184.02	276.76	333.56	233.59
% Relative To plane (Both)	100	151	182	127

If one wished, therefore, to select a mirror system to view target vehicles greater than 5 car lengths to the rear in both adjacent and far left lanes, the plane mirror would be the choice. On the other hand, the non-spherical (V) mirror or the convex mirror are the choices for viewing those greater distances plus closer target vehicles.

Figure 3-5 shows the cumulative FOM score (which is weighted by lane and distance importance) for each mirror at each distance. At further car length distances, i.e., 5-10 car lengths, the absolute differences among mirrors becomes small, since the importance weights given to performance at those distances are small. At distances closer than 5 car lengths, however, FOM differences emerge since performance is given a much larger importance (See Table 3-5) weight at the nearer distance.

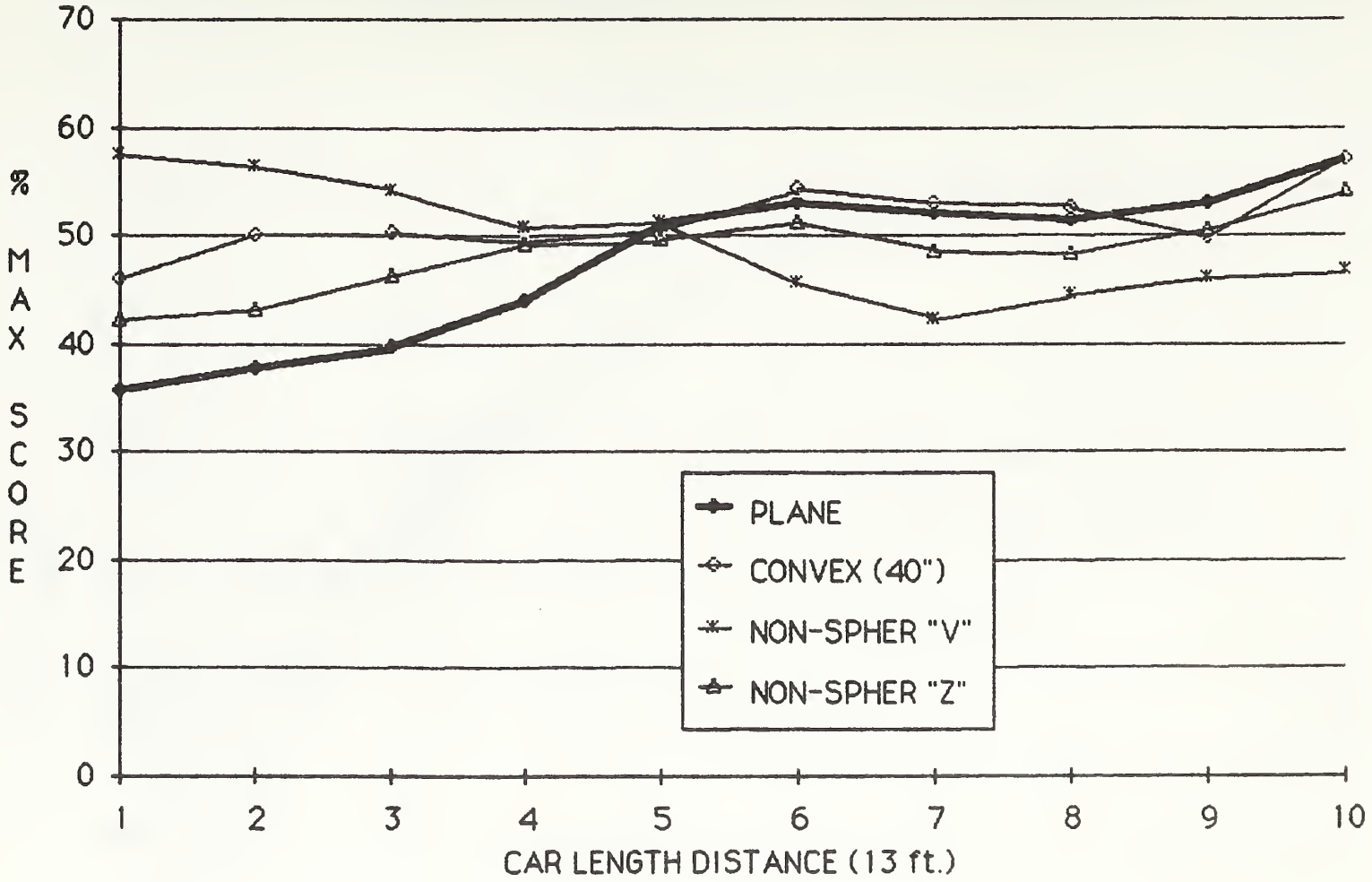


FIGURE 3.4 CUMULATIVE MAXIMUM POSSIBLE FOM SCORE FOR FOUR LEFT DOOR MOUNT MIRRORS (ADJACENT AND FAR LEFT LANES COMBINED)

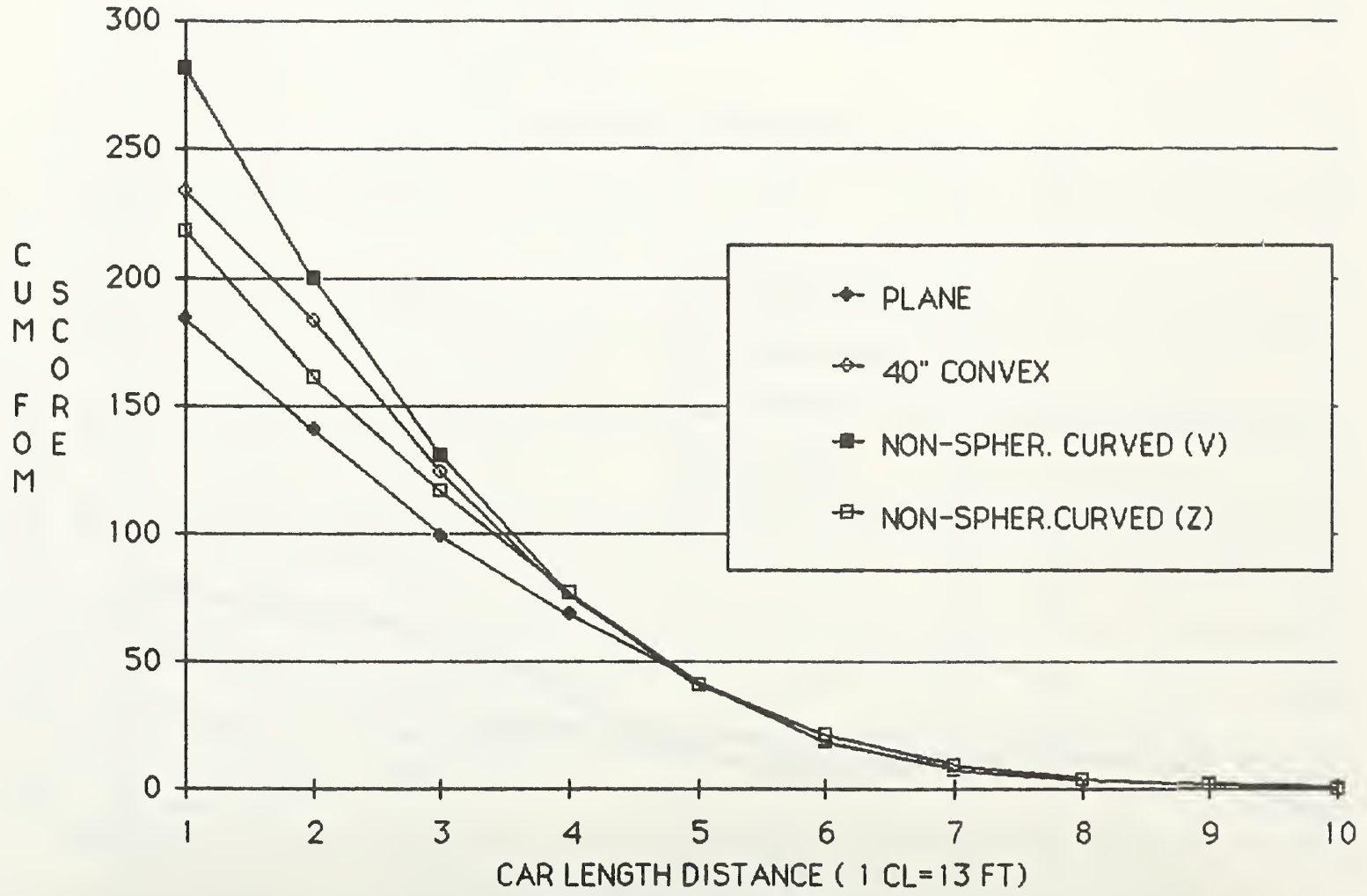


FIGURE 3.5 CUMULATIVE FOM SCORE FOR FOUR LEFT DOOR MOUNT MIRRORS (DAYLIGHT CONDITION, SINGLE TARGET VEHICLE THREAT, BOTH LEFT LANES)

3.3 DEVELOPMENT TEST SESSION II

3.3.1 Issues

The purpose of Session II was to test the adequacy of newly developed night stimuli and to develop and evaluate the fidelity of simulating rainfall on mirrors/windows during simulated-use testing. An abbreviated task was tested.

Development session II involved evaluation of three mirror types mounted on the passenger door. Daylight single target vehicle stimuli were used, as in Session I. In addition, night single target stimuli were used and rainfall on mirrors was simulated. Thus, the four conditions of day, and night, with and without rainfall, comprised the test situation for the three right side mirrors.

3.3.2 Mirrors

The following three mirrors were evaluated. Their characteristics are detailed in Table 3-1.

1. Plane (4.5" x 6.5")
2. 40 inch ROC convex (4.5" x 6.5")
3. Non-Spherical curved (V) (4.5" x 6.5")

3.3.3 Subjects

Due to the number of test condtions only four subjects, two male and two female, served as mirror users in the tests. Each subject received all mirror and ambient environment test conditions in a partially counterbalanced order.

3.3.4 Target Vehicle Stimuli

Daylight single target vehicle stimuli used in Session I were used for daylight conditions. In addition, an identical set of night single vehicle stimuli were tested.

3.3.5 Procedure

The procedure used in Session I was replicated except that motion performance testing was shortened by eliminating several distances. Only near, medium and far distances were included to reduce testing time. Subjects received mirror type, day/night and rain/no rain conditions in a partially counterbalanced order to minimize cumulative practice effects. Counterbalancing was not complete, due to the number of conditions and too few subjects.

3.3.6 Position and Motion Performance Measurement

Position and Motion were measured using the protocol of Session I. Data recording, reduction, weighting and analysis followed similar procedures as those previously described.

3.3.7 Methodological Findings

Three major methodological findings were observed. First, it appeared that the method of simulating rainfall using a simple garden mister provided quite realistic water droplets on mirror and side window surfaces. The method was rather crude and the need for a more elaborate method for controlling water and run-off, however, was apparent. Second, the night single vehicle stimuli were quite realistic, but it appeared that a more complex daytime and nighttime target vehicle environment was desirable to enhance face validity and enhance task difficulty, i.e., judging position/motion of a vehicle imbedded in other traffic.

Finally, it became clear that the method of preparing target vehicle stimulus slides was less than adequate, the difficulty being that the process of preparing and mounting the many duplicates of original slides resulted in target vehicle misalignment due to poor image registration. Another method was required to produce accurate image registration. The foregoing findings subsequently resulted in 1) the development of daylight and night multiple vehicle target stimuli and 2) re-photographing all target daylight and night slides using color negative (Eastman 5294) film to develop more precise slide duplicates from negatives.

3.3.8 Overall Performance Summary

Appendix G presents the detailed position, motion, weighted FOM scores and cumulative FOM scores for each of three mirrors tested--Plane, 40" ROC Convex and Non-Spherical (V)--for daylight/no rain, daylight/rain, night/no rain and night/rain viewing conditions. The upper left portion of the table defines the treatment conditions.

Table 3-7 summarizes the total FOM score for each mirror/condition and permits limited comparison of conditions and mirrors. It should be emphasized that data are the averages of only four subjects and counterbalancing of order effects was incomplete. As a result, data may not be as reliable as those obtained in development Session I using 3 times as many subjects.

3.3.9 Overall FOM Score

The Non-spherical (V) mirror clearly had a superior FOM score for both right lanes and all viewing conditions, compared to both the plane and the 40" ROC Convex mirror.

The Non-spherical (V) mirror obtained a FOM score of 172 while the convex and plane mirrors obtained scores of 151 and 49, respectively. The Non-Spherical mirror obtained FOM scores about 3-4 times the plane mirror FOM scores and about 15 percent greater than the convex mirror.

3.3.10 Effects of Rain, Night and Combined Viewing Conditions

Performance for the average of all three mirrors under night viewing was poorer than that under day viewing conditions. Overall night performance was 76 percent of day viewing conditions. Performance under the rain condition was 92 percent of no-rain viewing conditions. It is not clear, because of the small sample and incomplete counterbalancing, whether rain and/or night differentially affects performance for different types of mirrors since the decrement does not occur for each individual mirror type. Incomplete counterbalancing of test order due to limited subjects probably accounts for this finding. The overall degrading effect of rain and night viewing, however, is clear.

Figure 3-6 illustrates the percent of the maximum possible FOM score (cumulative from 10-1 car lengths) for the non-spherical (V) mirror for 3 viewing conditions--day/no-rain, night/no-rain and night/rain. The small subject sample may again be responsible for night/rain performance FOM being superior (larger) at greater distances (where performance differences are smaller). The cumulative totals at nearer distances, however, illustrate the decrement in performance, due to night and combined night/rain viewing conditions on this mirror.

Figure 3-7 illustrates the percentage of the maximum possible cumulative (10 to 1 car lengths) FOM score as a function of distance for the three mirrors for daylight viewing conditions. The plane mirror, as in Session I (left door mount), showed superior performance at greater distances (10-6 car lengths) but very inferior performance at near distances (5-1 car lengths). The non-spherical mirror again showed poorest performance at greater distances and superior performance at near distances, but performance was quite similar to that of the convex mirror. The poor plane mirror performance was no doubt due to its extremely limited FOV, permitting viewing of target vehicles only at distances greater than 5 car lengths in the adjacent right lane and

TABLE 3.8 SUMMARY OF MIRROR TOTAL FOM (RIGHT DOOR MOUNT)

	DAY			NIGHT			TOTAL				
	DRY	RAIN	AVE.	DRY	RAIN	AVE.	DRY	RAIN	AVE.	NIGHT/ DAY%	RAIN/ DRY%
PLANE	57	50	54	36	51	44	46	51	49	81.48	110.87
40" CONVEX	182	178	180	121	124	123	151	151	151	63.33	110.00
NON-SPHER(V)	204	172	188	173	139	156	188	156	172	82.98	82.98
AVERAGE	147	134	141	110	105	107	129	119	124	75.89	92.25
CONVEX/ PLANE %	319	356	333	336	243	280	328	296	308		
NON-SPHER(V)/ PLANE %	358	344	348	481	273	355	409	306	351		
NON-SPHER(V)/ CONVEX %	112	97	104	143	112	127	125	103	114		

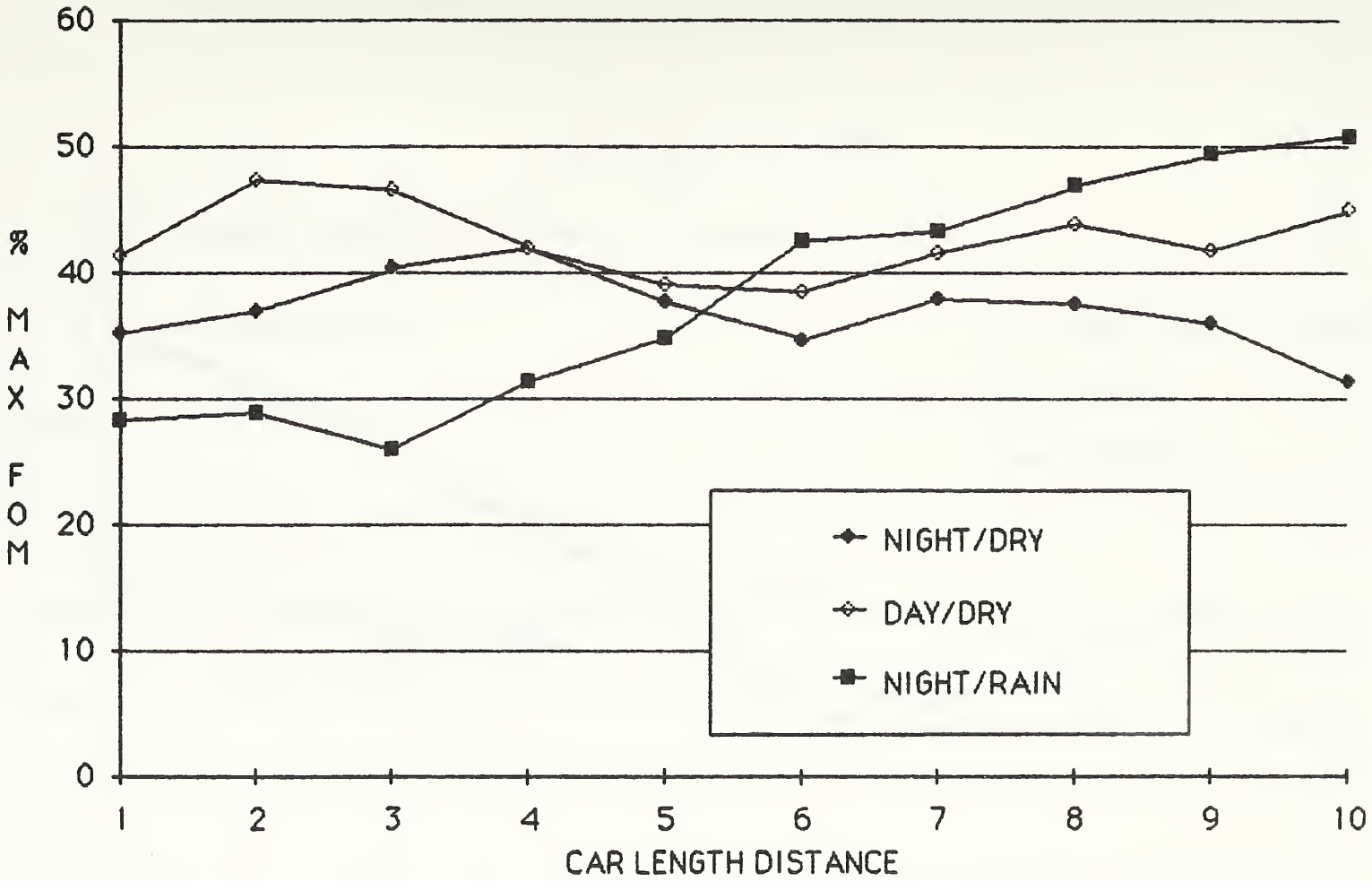


FIGURE 3.6 PERCENT OF MAXIMUM POSSIBLE FOM FOR NON-SPHER. (V) MIRROR (RIGHT DOOR MOUNT LOCATION)

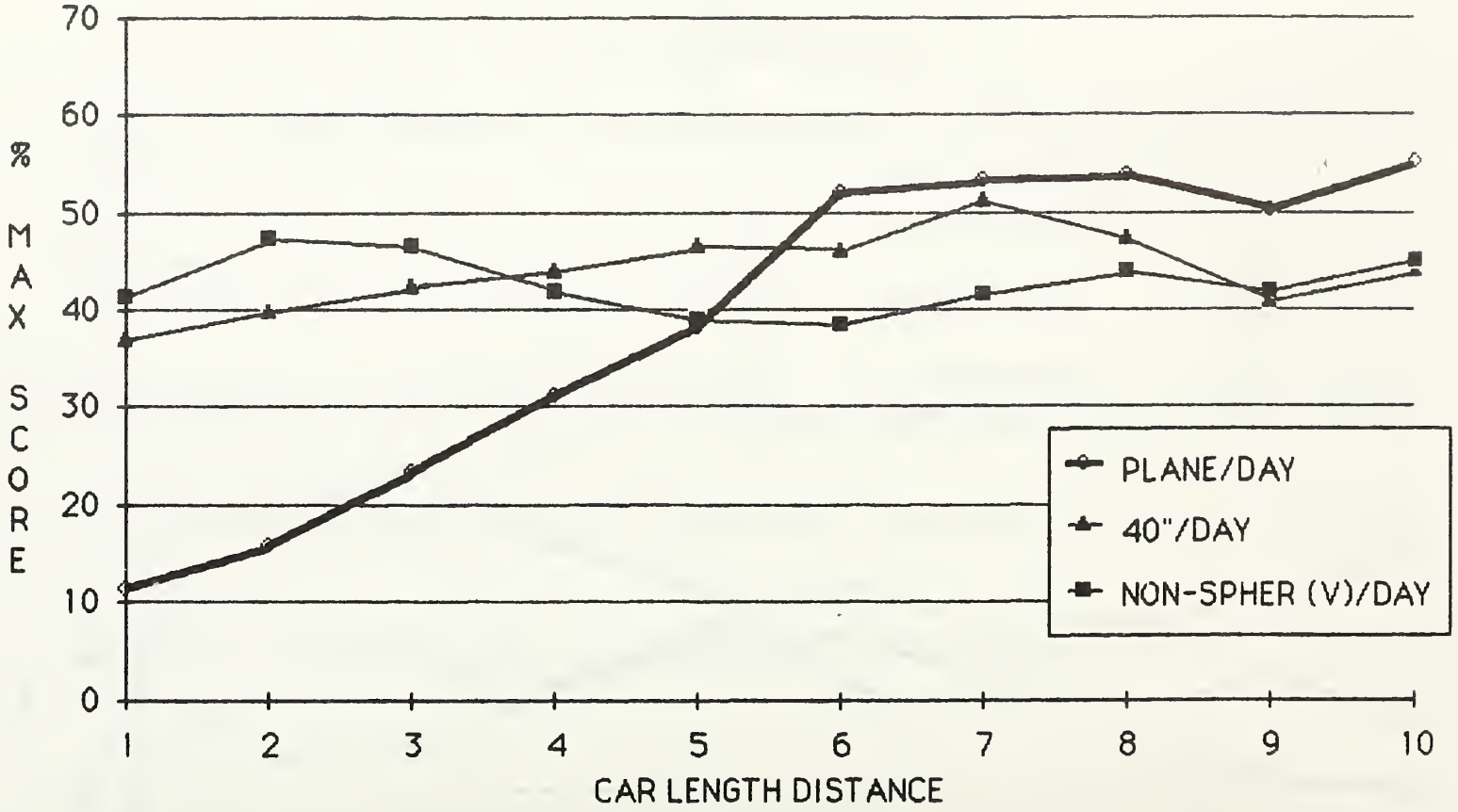


FIGURE 3.7 CUMULATIVE PERCENT OF MAXIMUM POSSIBLE FOM SCORE (DAYLIGHT CONDITION, ADJACENT AND FAR RIGHT LANES COMBINED)

only at even greater distances in the far lane.

Figure 3-8 illustrates the same FOM measures during night viewing. Performance curves for the 3 mirrors at various distances were similar in shape to daylight performance curves except that the 40" convex mirror had the highest FOM scores at greater distances.

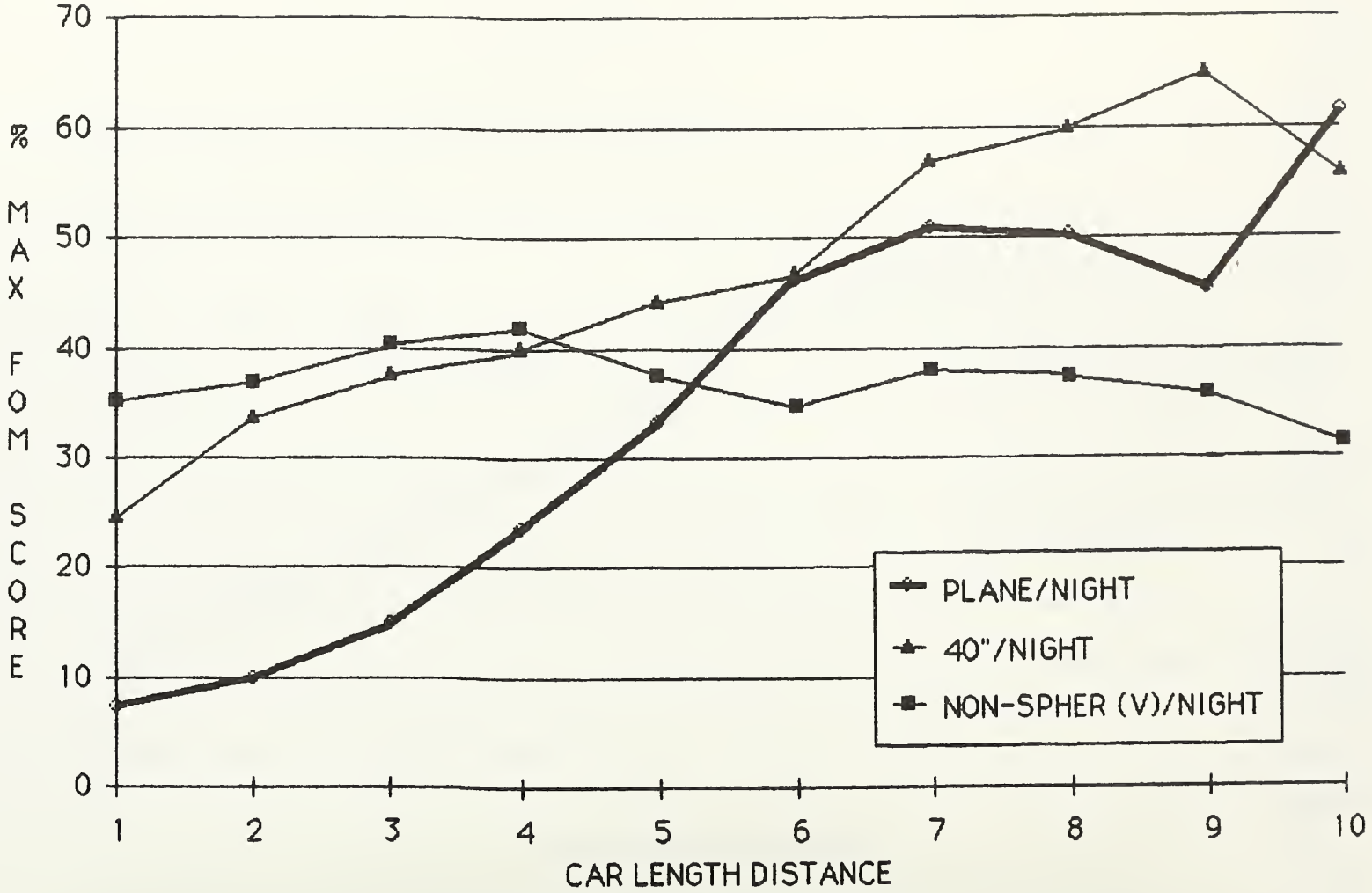


FIGURE 3.8 CUMULATIVE PERCENT OF MAXIMUM POSSIBLE FOM SCORE (NIGHT CONDITIONS, ADJACENT AND FAR RIGHT LANES COMBINED)

3.4. DEVELOPMENT TEST SESSION III

3.4.1 Issues

Development Session III involved the evaluation of two right door mounted mirrors. Both day and night viewing conditions were used. In addition, a new set of target vehicle stimuli were employed (comprised of 4 vehicles, termed multiple target stimuli, as opposed to single target vehicle stimuli used in Sessions I and II). The use of more complex stimuli added face validity to the task and it was hypothesized that multiple targets would increase task difficulty, perhaps more so for some mirror designs than others. Session III also investigated three levels of practice/training: 1) none; 2) training plus one test session; and 3) two training plus two test sessions. Training and test sessions each required about 1 hour of intensive practice per mirror and condition.

3.4.2 Mirrors

Two mirrors were tested. In addition to the non-spherical (V) mirror used in Session I and II, a 20 inch convex mirror was fabricated such that the horizontal FOV was virtually identical to that of the non-spherical (V) mirror. Vertical FOV's were similar but not identical. A comparison of mirrors having the same horizontal FOV but differing in curvature characteristics was intended.

3.4.3 Target Vehicle Stimuli

Position performance was measured for multiple as well as single threat vehicle stimuli. The multiple target stimuli contained four vehicles, one target embedded in a cluster of three other vehicles. Motion performance, however, was measured only with the single threat stimuli. Both position and motion performance were measured under daylight and night viewing conditions.

3.4.4 Subjects

Due to the extensive time required to implement the 3 levels of training, only 6 subjects were used, three male and three female. Half were under 40 years of age and half over.

3.4.5 Procedure

The testing procedure and computer software were modified to accommodate the newly developed complex target vehicle stimuli. The procedures were fundamentally the same as those in Sessions I and II and are those recommended for future implementation of the protocol in Chapter 4.0.

3.4.6 METHODOLOGICAL FINDINGS

3.4.6.1 Results

Appendix D presents the detailed results for position and motion scores and weighted cumulative FOM for each lane and for combined lanes for daylight, night, single and multiple target stimuli, and for 3 levels of training for each of the two mirrors.

3.4.6.2 Multiple Target Vehicle Stimuli

Multiple vehicle target stimuli, both day and night, resulted in poorer overall (position and motion) performance and FOM's than single target vehicle stimuli for both the non-spherical (V) and 20 inch convex mirrors. The overall FOM for complex stimuli was approximately 90% of the single stimuli FOM score for both mirrors, day and night combined.

The complex stimuli add a dimension of realism to the task and generally make the task more difficult. Findings indicate that their use should be integrated into the final protocol. Their use may be significant in discriminating among some mirror characteristics.

3.4.6.3 Effects of Training

The effects of 3 levels of training are illustrated in Figure 3.9. A 25 percent increase in FOM score is apparent for both the 40" Convex and non-spherical (V) mirrors. The effect appears to have about asymptoted at the third level. Since the characteristics of these mirrors are about as unique to the public as any to be encountered in future testing, it appears that at least two complete training test sessions should be conducted with final testing occurring after the second training session.

3.4.6.4 Overall Mirror Performance (Effect of Spherical Design

As noted, the two mirrors (non-spherical V and 20 inch convex) had identical horizontal FOV's and similar vertical FOV's. They differed primarily with respect to the curvature of the surface. The non-spherical (V) mirror was comprised of a non linear surface with a ROC ranging from near flat to about 6 inches ROC at the outboard edge. The 20 inch convex mirror is comprised of a uniformly curved surface.

The FOM score for the two mirrors indicated that the 20 inch mirror outperformed the non-spherical (V) mirror for single

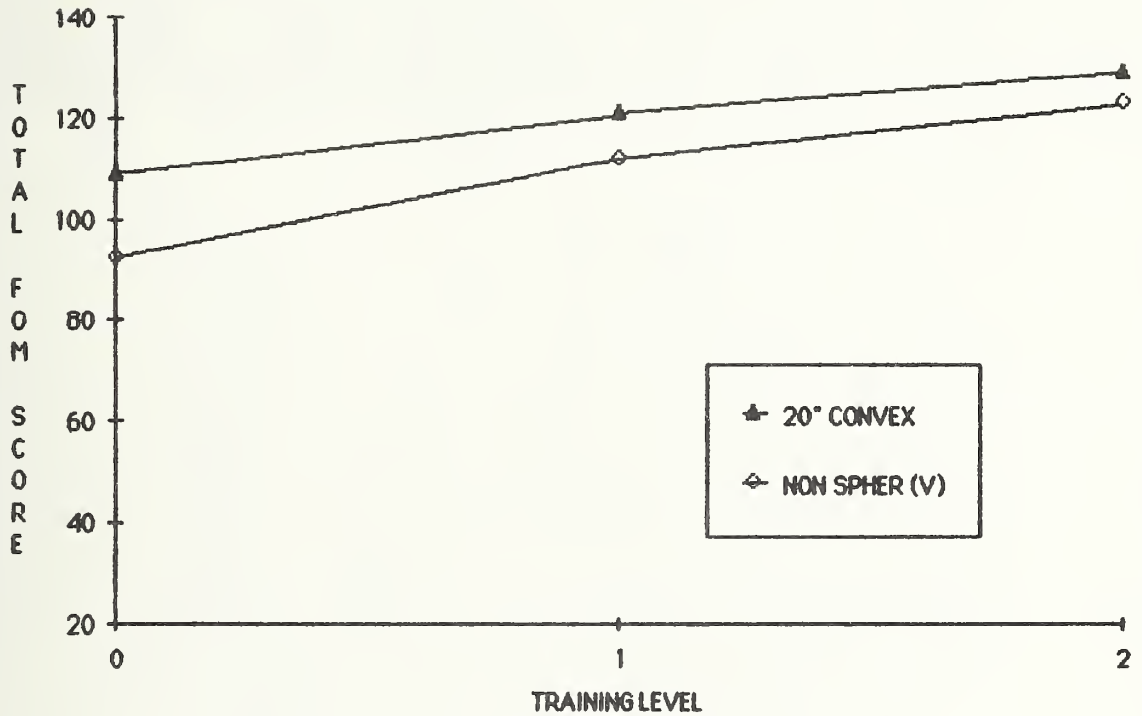


FIGURE 3.9 TOTAL FOM SCORE AS A FUNCTION OF TRAINING LEVEL FOR TWO RIGHT DOOR MOUNT MIRRORS

(DAYLIGHT CONDITION, MULTIPLE TARGET VEHICLE THREAT, BOTH RIGHT LANES)

and multiple threat vehicle stimuli, both in daylight and night viewing conditions. Figure 3.10 illustrates the cumulative percent of the maximum possible FOM score obtained at each of the 10 car length distances from 10 through 1. Apparently, for equivalent FOV's uniformly curved mirrors are superior to non-spherical curved mirrors. The figure also illustrates the score for the 40 inch smaller FOV mirror obtained in Session II under virtually identical conditions (day, single threat vehicle, equivalent training at level 1, the exception being the use of 4 different subjects). Performance of the 40 inch mirror beyond 5 car lengths was similar to that of the 20 inch mirror. However, the smaller 40 inch mirror FOV resulted in a performance decrement closer than 5 car lengths because far lane and, successively, near lane targets disappeared from the mirror FOV. This comparison must be considered tentative since data were from different (although similar) test sessions and the number of subjects was small.

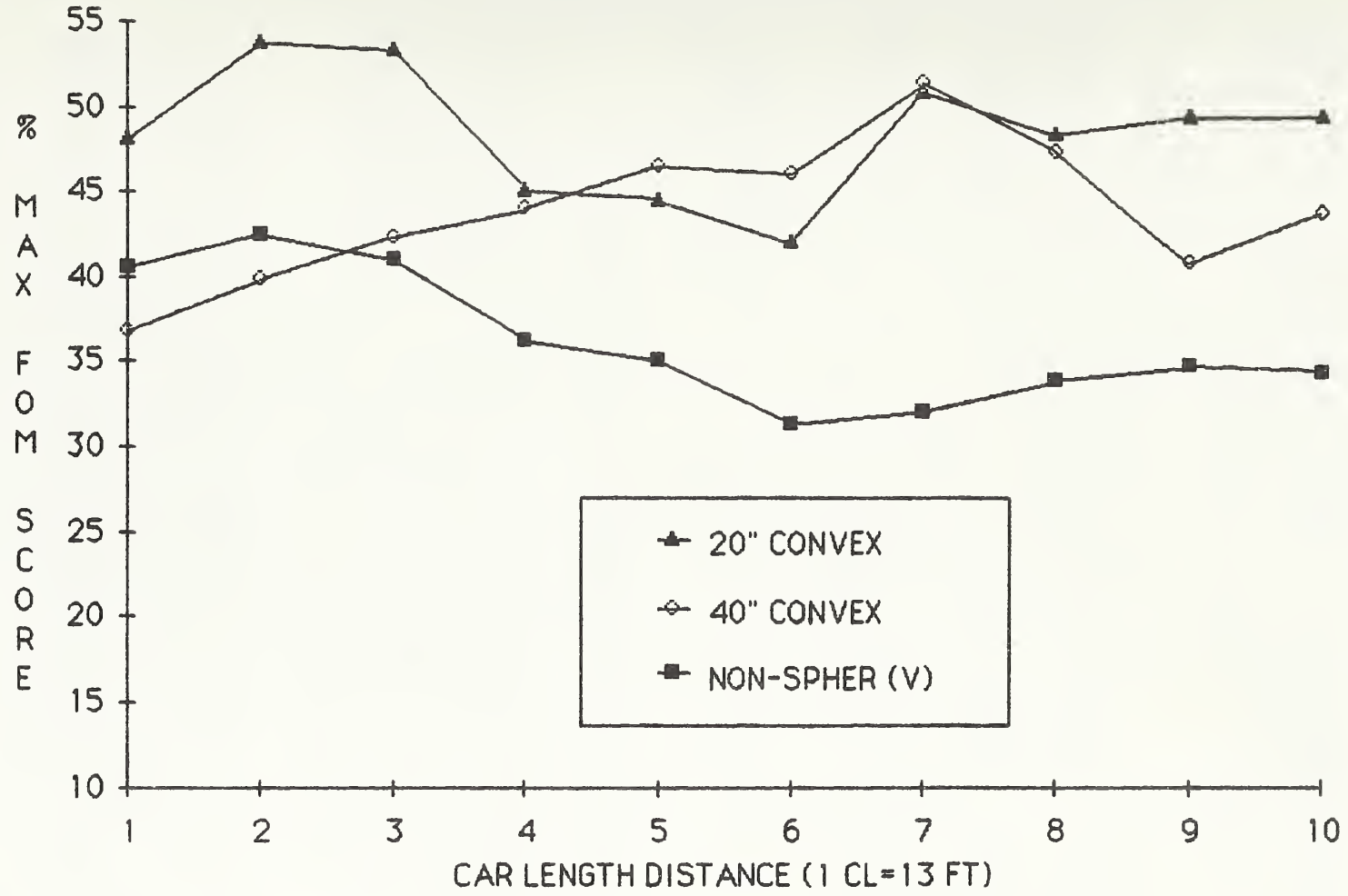


FIGURE 3.10 CUMULATIVE PERCENT OF MAXIMUM POSSIBLE FOM SCORE FOR THREE RIGHT DOOR MOUNT MIRRORS (DAYLIGHT CONDITION, SINGLE VEHICLE THREAT, LEVEL I TRAINING, BOTH RIGHT LANES)

3.5 SUMMARY OF RESULTS FOR SESSIONS I TO III

3.5.1 Performance Summary

Table 3.9 illustrates the performance (percent of maximum possible FOM Score) for each mirror for the various test conditions of Sessions I to III. Since the focus of the sessions was on development of test methods using a few subjects and slightly different protocol, the between session comparisons should be considered tentative.

Performance of mirror systems, left or right, appears to be heavily dominated by FOV, i.e., the larger the FOV the better the performance, independent of mirror characteristics. Apparently the considerable training enabled users to overcome possible effects of various distortions due to unique curvatures. In Session I and II the largest FOV mirrors obtained the best performance over all distances and lanes, although performance at greater distances (where FOV's overlapped) the plane mirror was superior. In Session III, where FOV was held constant with mirror characteristics being the principal variable (i.e., non linear vs linear curvature) the 20 inch convex mirror exhibited superior performance. Overall it then appears that flat is superior to convex and convex superior to non-spherical curved characteristics given equal fields of view. Alternatively, where FOV is not equal, devices with larger FOV's obtain superior performance to those with smaller FOV's given extensive practice.

3.5.2 Correlation of FOV Measures and FOM Scores

One of the purposes of obtaining the characteristics measures described in Volume I was to be able to relate mirror physical characteristics with simulated-use performance measures. Figure 3-11 shows the relationship between horizontal FOV measures (in degrees) from Volume I and percent of maximum possible FOM scores from Table 3-9. The latter data are for single target vehicle, daylight, no rain conditions from tests Sessions I to III. Left and right mirror locations are shown separately since FOV varies.

While FOM data are from different sessions employing only a few subjects and slightly different protocol the strong positive relation between FOV and FOM is quite clear. The relationship would no doubt be stronger if FOV was not confounded with other mirror surface characteristics, e.g., linear vs non-linear curvature. Further studies to clarify the relationship between such variables and simulated-use performance must carefully control such confounding.

TABLE 3-9 SUMMARY OF MIRROR PERFORMANCE* FOR THREE DEVELOPMENT SESSIONS

CONDITION	DAYLIGHT	NIGHT	DAYLIGHT	NIGHT
SESSION I (N=12)				
- PLANE	37.3			
- 40" CONVEX	47.4			
- NON-SPHER (V)	57.2			
- NON-SPHER (Z)	44.2			

SESSION II (N=4)	DRY	RAIN	DRY	RAIN
- PLANE	11.5	10.2	7.3	10.3
- 40" CONVEX	36.8	36.1	24.5	25.2
- NON-SPHER (V)	41.4	34.9	35.1	28.2

SESSION III** (N=4)	SINGLE THREAT	MULTIPLE THREAT	SINGLE THREAT	MULTIPLE THREAT
- NON-SPHER (V)	39.6	38.6	34.7	27.1
- 20" CONVEX	47.3	41.7	53.5	49.3

* PERCENT OF MAXIMUM POSSIBLE FIGURE OF MERIT (1-10 car lengths)

** Level 1 Training

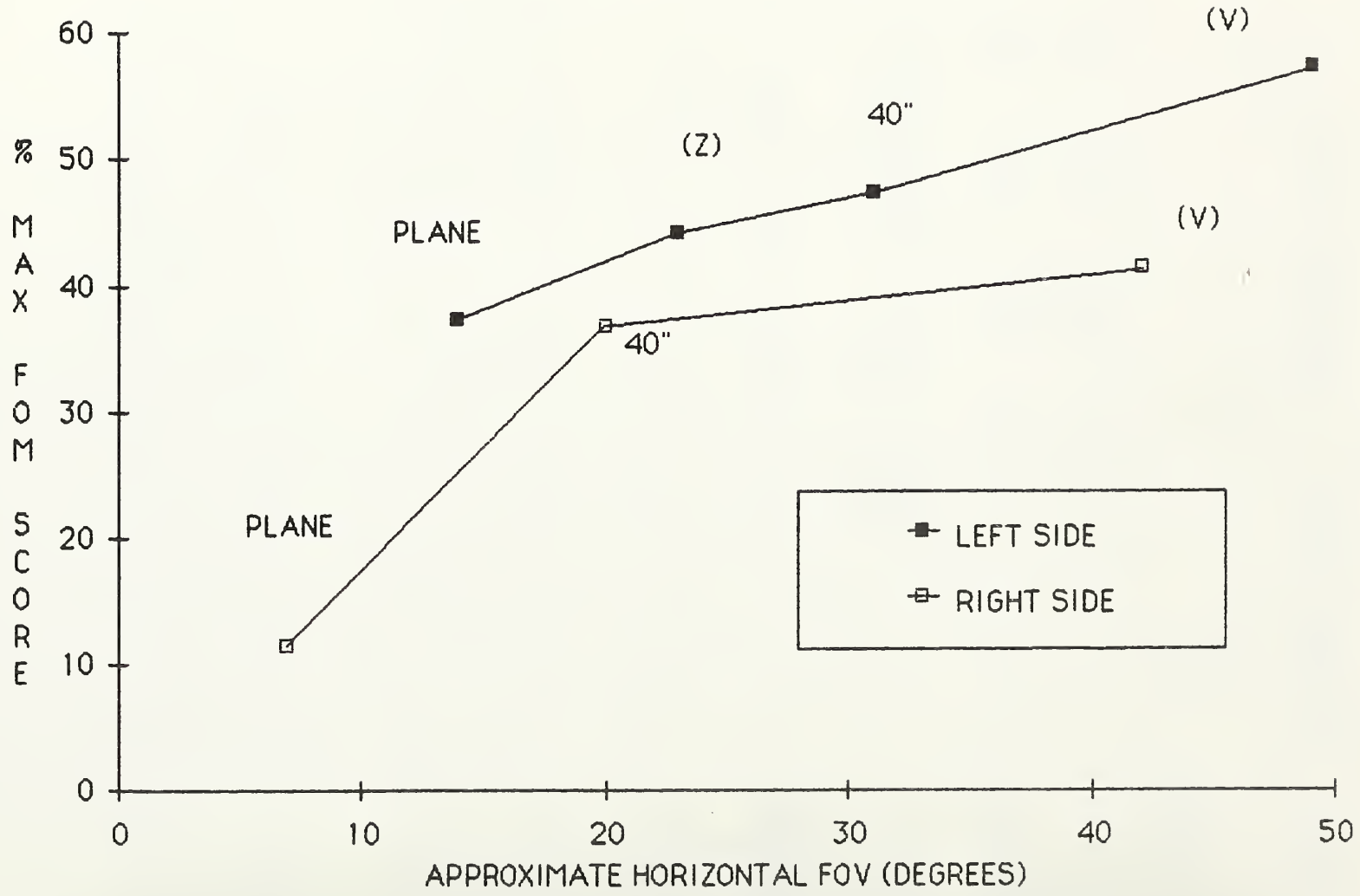


FIGURE 3.11 RELATIONSHIP BETWEEN FOV (DEGREES) AND FOM SCORES

4.0 SIMULATED-USE TESTING PROTOCOL

4.1 Introduction

This chapter describes in detail the recommended simulated-use rear vision system test protocol. It is assumed that the reader has read the preceding chapter (3.0) describing the background and development of the protocol since the procedures are of necessity, complex due to the many test conditions, need to follow procedures closely and inherent difficulties in testing using human subjects.

4.1.1 Organization

Simulated-Use Testing requires the measurement of mirror use performance by observers in a simulated static driving situation. This section describes, in detail, how to design, implement and analyze such testing. The section is comprised of the following sub-sections:

Recommendations to the Experimenter (4.2)
Designing the Test (4.3)
Facility Setup (4.4)
Running a Subject (4.5)
Data Analysis (4.6)
Conclusions (4.7)

4.2 Recommendations to the Experimenter

Simulated-use protocol testing is a complex matter and this section should be carefully read and understood by the experimenter and anyone else involved with the testing. All tests must be designed, the facility setup and checked, at least two subjects fully run and a complete data analysis completed prior to conducting actual tests. It is also necessary for the experimenter himself to be tested over all conditions and mirrors in order to become familiar with all aspects of the procedures.

4.3 Designing the Test Plan

4.3.1 Overview

The test design plan is based on specific tests of selected rear-vision devices using a specific number of subjects for both Position and Motion Performance. Within both of these categories 1) demonstration, 2) training and 3) actual test segments are conducted. Stimulus materials are available for specific conditions, e.g., day, night, and these are to be randomized across as well as within subjects. The test design section is made up of the following sub-sections:

4.3.2 Subjects

It is recommended that a minimum of twelve subjects be tested for a reliable analysis of any rear-view vision system. Four subjects in each of the age ranges 16-30, 31-45 and 46-60 Half of the subjects in each age range should be female and half male. More subjects may be desirable,depending upon the number of devices to be tested, to assure complete counterbalancing of conditions and mirror orders to eliminate confounding.

4.3.3 Test Mirrors

4.3.3.1 Overview

A variety of types of rear view mirrors or other devices can be subject to testing/evaluation. As the number of mirrors tested increases the time to test dramatically increases, as will be shown later. It is essential to have all the test devices on hand so that the design can be planned in detail before the testing begins.

4.3.3.2 Performance Standard and Reference

Since each set of rear-vision system evaluation tests may be conducted by different individuals or institutions and may use different subjects, a performance reference is necessary to assure performance data gathered at different times and places are comparable. For example, a set of simulated-use performance tests conducted on mirrors A, B and C in 1987 must be comparable to mirrors X, Y and Z tested in 1988.

In order to permit comparability of results and/or allow data to be adjusted so that it is comparable, it is recommended that a reference mirror be included in all tests. A 4.5 x 6.5 inch plane and a 40 inch convex mirror is recommended for left and right vehicle side mirror testing, respectively. A "typical" inside mirror should be represented across all tests, if such device types are to be tested in the future.

These devices will serve as a standard where performance is to be compared across all future tests. If data are virtually identical for different sessions using reference mirrors, it can be safely assumed that data for other devices tested are comparable. If not, eg. FOM's differ by say

+10%, appropriate mathematical adjustments to device performance FOM's can be made.

4.3.3.3 Test Mirror Location

Three test mirror locations are possible:

1) left "outside" mirror location
2) right "outside" mirror location
3) center "inside" mirror location

Either one or all of these locations can be tested for as many mirror devices as is desired. The procedure for testing the left and right mirror locations has been extensively developed (see Chapter 3.0). The procedure for testing the center mirror position has not been fully developed since efforts focused upon side mirrors furnished for testing. The principles for other mirror locations, e.g., inside or fender, remain the same, however, as for right or left mirror position testing. Other considerations, ie. rear window size, will have to be taken into account. Increasing the number of mirror positions to be tested also dramatically increases the time to test.

4.3.4 Motion Performance Testing

4.3.4.1 Overview

The background needed to design the Motion Performance segment of the testing is given in the following sub-sections:

Subject Task Description (4.3.4.2)
Conditions (4.3.4.3)
Stimulus Slide Trays (4.3.4.4)
Phases of Testing (4.3.4.5)
Sequences and Trial Randomization (4.3.4.6)
Number and Type of Trials (4.3.4.7)
Between and Within Subject Randomization (4.3.4.6)

4.3.4.2 Subject Task Description

For all conditions the motion task requires determining, through successive slide viewings, a target vehicle's relative direction of motion. The direction of motion is either, 1) closing, 2) maintaining the same position or 3) receding.

4.3.4.3 Conditions

Day and night test conditions are available for both Motion and Position Performance. Stimuli for these conditions are available for the left, or driver-side of the test vehicle

as well as for the right passenger-side location. A limited amount of stimulus material exists for the center mirror location.

Motion Performance is to be tested in the adjacent and far lanes for a mirror location. As stated above, both day and night stimuli are available for the above conditions. All stimuli used for Motion Performance are made up of single target vehicles. A total of eight possible conditions, or stimulus sets are available:

1) right side, day, adjacent lane,
2) right side, day, far lane,
3) right side, night, adjacent lane,
4) right side, night, far lane,
5) left side, day, adjacent lane,
6) left side, day, far lane,
7) left side, night, adjacent lane and
8) left side, night, far lane.

If a right side rear-vision device is to be tested, only conditions 1-4 are used; if the device is a left side mirror only, conditions 5-8 are tested; if the device applies to both left and right sides conditions 1-8 are tested.

The center mirror location will ultimately have stimulus sets available for both day and night in the center lane, adjacent right and left lanes, and far right and left lanes. Because this mirror position was not tested, single target vehicle stimuli are available only for the following conditions:

1) center mirror position, day, center lane (directly behind)
2) center mirror position, day, right and left adjacent lanes
3) center mirror position, day, right and left far lanes

Additional stimuli, such as night can be prepared as needed using procedures described in Appendix A.

4.3.4.4 Stimulus Slide Trays

Four stimulus slide trays are available for right mirror position testing:

1) LAMD - lane adjacent, motion, day
2) LFMD - lane far, motion, day
3) LAMN - lane adjacent, motion, night
4) LFMN - lane far, motion, night

In order to test the left mirror position, the slides, in all trays, must be reversed left/right. These four trays are used for all phases of motion performance testing discussed below.

4.3.4.5 Phases of Testing

All Motion Performance conditions are tested first within any one mirror. Position performance is then tested for a mirror and the process is repeated for other mirrors.

Within any condition, ie. day, far lane, the following testing segments and order are recommended:

1) Demonstration,
2) Actual test,
3) Training segment,
4) Actual test,
5) Steps 3 and 4, training and actual test segments, are repeated.

The subject, therefore, receives three actual tests, one after no training (testing level 0), one after an intermediate amount of training (testing level 1), and one after an extensive amount of training (testing level 2) to estimate learning.

4.3.4.6 Sequences and Trial Randomization

Randomized trials for motion testing are generated through computer sequences which control slide tray movement. All the conditions described earlier have corresponding slide trays with target vehicle/positions in the trays for 0-14 car lengths at one-half car-length distances as described in Appendix E. The demonstration sequence identification (ID) is 09 where 09 identifies the computerized sequence number. The three training sequence ID's are 40, 45 and 50. The actual test sequences are 60 and 65. Trial descriptions for all sequences are given in detail in Appendix E.

4.3.4.7 Number and Type of Trials

The demonstration consists of 2 trials where a trial is a sequence of target vehicle slides. Training consists of 3 trials. The actual test consists of 9 trials. The demonstration requires only that the subject view the slides. The training requires the subject to give a response on the response panel as well as verbally, and requires the experimenter to give feedback. The actual test requires only a subject response via the response panel.

4.3.4.8 Between and Within Subject Randomization

Mirror order should be randomized or counterbalanced across subjects. Thus, if two mirrors are being tested, half the subjects should get mirror A first and half should get mirror B first.

Within any Motion Performance test for a subject the most important consideration is condition--either day or night. Day and night are to be counterbalanced across all mirrors tested for a subject. Thus, if day is given first on mirror A then night would be first on mirror B. Within the day or night condition lane position, either adjacent or far, must also be counterbalanced. This counterbalancing must occur between subjects as well.

Sequence order, i.e., order of target vehicle slides, should be randomized within each of the two segments-- training and actual testing. Thus, within any one subject, the training sequences, 40, 45 and 50, can be randomized across the four motion conditions as well as across the number of mirrors being tested. Within the actual testing, the sequences 60 and 65 should be alternated across conditions as well as across mirrors.

4.3.5 Position Performance Testing

4.3.5.1 Overview

The background needed to design the Position Performance segment of the testing is presented in the following subsections:

Subject Task Description (4.3.5.2)
Conditions (4.3.5.3)
Stimulus Slide Trays (4.3.5.4)
Phases of Testing (4.3.5.5)
Sequences and Trial Randomization (4.3.5.6)
Number and Type of Trials (4.3.5.7)
Between and Within Subject Randomization (4.3.5.8)

4.3.5.2 Subject Task Description

The position task for the daytime condition involves determining, after one viewing, the target vehicle's (e.g., closest vehicle) distance, (number of car lengths back, varying from zero to ten) and lane position (either adjacent or far). The task for the night condition involves determining, after one viewing, the closest vehicle's distance, (number of car lengths back varying from zero to ten) regardless of lane position.

4.3.5.3 Conditions

Position Performance can also be tested for both the left and right mirror locations. The total conditions resulting include:

1) right side, daytime
2) right side, nighttime
3) left side, daytime
4) left side, nighttime

Within each of these conditions, or corresponding stimulus sets, both lanes (adjacent and far) and target types (single and multiple) are included.

4.3.5.4 Stimulus Slide Trays

Ten stimulus slide trays are available for the right/left mirror position testing:

1) PDF1/PDB1 - demo-training day forward #1/demo-training day reverse #1
2) PDF2/PDB2 - training day forward #2/training day reverse #2
3) PDF3/PDB3 - training day forward #3/training day reverse #3
4) ADF1/ADB1 - actual day forward #1/actual day reverse #1
5) ADF2/ADB2 - actual day forward #2/actual day reverse #2
6) PNF1/PNB1 - demo-training night forward #1/demo-training night reverse #1
7) PNF2/PNB2 - training night forward #2/training night reverse #2
8) PNF3/PNB3 - training night forward #3/training night reverse #3
9) ANF1/ANB1 - actual night forward #1/actual night reverse #1
10) ANF2/ANB2 - actual night forward #2/actual night reverse #2

Forward/reverse slide tray direction provides different stimulus orders. When testing the left mirror position, the slides in all trays are reversed (left/right). These ten trays are used for all phases of position performance testing which are discussed below.

4.3.5.5 Phases of Testing

Within any condition, eg. night, the following testing segments and order are recommended:

1) Demonstration/training,
2) Actual test,
3) Training segment,
4) Actual test,

5) Steps 3 and 4, training and actual test segments, are repeated.

The subject therefore receives three actual tests, with training levels 0, 1 and 2 as in the Motion Performance tests.

4.3.5.6 Sequences and Trial Randomization

Randomized trials for position testing are generated through randomized slide trays as well as by computer sequences which control slide tray movement. Trays PDF1/PDB1 and PNF1/PNB1 are used for the demonstration. Each tray is either run forward, sequence 30, or reversed, sequence 35. Trays PDF2/PDB2, PDF3/PDB3, PNF2/PNB2 and PNF3/PNB3 are used for training. Each tray is either run forward (sequence 20) or reversed (sequence 25). Trays ADF1/ADB1, ADF2/ADB2, ANF1/ANB1 and ANF2/ANB2 are used for actual testing. Each tray is either run either forward, sequence 10, or reversed, sequence 15. Details are presented in Appendices F and G.

4.3.5.7 Number and Type of Trials

The demonstration segment consists of 8 trials. The training consists of 32 trials. The actual test consists of 44 trials. The demonstration requires the experimenter to precue, i.e., provide the subject with advance information on target distance, for the first four trials and give feedback (to subject's verbal responses) for the last four. The training segment requires the experimenter to precue for the first 16 trials and give feedback for the last 16. The actual test only requires a subject's verbal response.

4.3.5.8 Between and Within Subject Randomization

Within any position performance test for a subject the overriding factor is again condition, either day or night. Day and night must be counterbalanced across all mirrors tested for a subject. Condition, either day or night, must also be counterbalanced between subjects.

Within both day and night conditions, the sequences used for the demonstration segment should be randomized within subjects (only one tray for each condition). Within both day and night conditions, the slide trays and sequences used for training must be randomized within subjects (two trays exist for each condition). Within both day and night conditions, the slide trays and sequences used for actual testing must be randomized within subjects (two trays exist for each condition).

4.3.6 Design Layout

All sequences, conditions and stimulus orders for all subjects should be planned in detail, an example of which is shown in Figure 4-1. Each form contains information for one testing condition and sequence, whether used for Motion or Position testing. Forms should be organized in the order that they are to be given to a subject. The form contains a space for responses which are only needed for Motion Performance if a mistake is made by a subject but are needed for all actual testing responses for Position Performance. The following section gives an example of the design layout for four subjects and two mirrors.

4.3.7 Example of Design Layout

The following 8 page layout shown can be used for testing four subjects on two mirror devices. Each layout page contains information for one subject and one mirror. Shown is testing order for test type and condition, mirror test order within subjects and tray and computer sequence used for each segment of testing. The design is based on the randomization and test order procedures described earlier.

Motion Performance testing is given first within any one mirror. Within Motion Performance testing one total condition is given, ie. day, far lane, and then testing is completed for the following conditions. Each Motion Performance condition, or testing segment, uses only one slide tray, ie. LAMD.

Position Performance is then tested using the same mirror. Within Position Performance testing either daytime or nighttime is tested first. Separate trays are used for all segments, ie. training vs actual tests, and specific computer sequences are also randomized. Each Position Performance tray, eg. PDF2/PDB2, is either run forward or backward using the program sequences given.

FIGURE 4.1 SAMPLE POSITION AND MOTION RESPONSE RECORDING FORM

RESPONSE SCORE FORM

SUBJECT NO._____

PRACTICE/ ACTUAL _____

POSITION/ MOTION _____

MIRROR:_____

CONDITION:_____

SEQUENCE NO._____

DATE:_____

TIME:_____

TRIAL NO.	RESPONSE
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	
43	
44	

SUBJECT: 1 MIRROR: 2 MIRROR TEST ORDER: 2/1

Test Type

Motion Performance	Testing Order							
	FIRST		**SECOND**		**THIRD**		**FOURTH**	
	NGT/FAR LN.		NGT/ADJ. LN.		DAY/FAR. LN.		DAY/ADJ. LN.	
	Tray	**Seq**	**Tray**	**Seq**	**Tray**	**Seq**	**Tray**	**Seq**
Demo	LFMN	09	LAMN	09	LFMD	09	LAMD	09
Actual		65		60		65		60
Training		40		45		40		40
Actual		65		65		60		65
Training		40		45		45		45
Actual		60		60		65		60

TESTING ORDER — **FIRST**

Position Performance	Testing Order			
	FIRST		**SECOND**	
	NIGHT		DAY	
	Tray	**Seq**	**Tray**	**Seq**
Demo	PNF1/PNB1	30	PDF1/PDB1	30
Actual	ANF2/ANB2	15	ADF2/ADB2	15
Training	PNF2/PNB2	20	PDF2/PDB2	20
Actual	ANF1/ANB1	10	ADF1/ADB1	10
Training	PNF3/PNB3	25	PDF3/PDB3	25
Actual	ANF2/ANB2	10	ADF2/ADB2	10

TESTING ORDER — **SECOND**

SUBJECT: 1 MIRROR: 1 MIRROR TEST ORDER: 2/1

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	DAY/FAR LN.		DAY/ADJ. LN.		NGT/ADJ. LN.		NGT/FAR. LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LFMD	09	LAMD	09	LAMN	09	LFMN	09
Actual		60		65		60		65
Training		40		40		45		40
Actual		65		60		60		60
Training		45		45		45		40
Actual		60		65		65		65

TESTING ORDER

FIRST

SECOND

Position Performance	Testing Order			
	FIRST		SECOND	
	DAY		NIGHT	
	Tray	Seq	Tray	Seq
Demo	PDF1/PDB1	35	PNF1/PNB1	35
Actual	ADF1/ADB1	10	ANF1/ANB1	10
Training	PDF2/PDB2	20	PNF2/PNB2	20
Actual	ADF2/ADB2	10	ANF2/ANB2	10
Training	PDF3/PDB3	25	PNF3/PNB3	25
Actual	ADF1/ADB1	15	ANF1/ANB1	15

SUBJECT: 2 MIRROR: 2 MIRROR TEST ORDER: 2/1

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	DAY/ADJ. LN.		DAY/FAR LN.		NGT/ADJ. LN.		NGT/FAR LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LAMD	09	LFMD	09	LAMN	09	LFMN	09
Actual		65		60		65		60
Training		45		40		45		45
Actual		65		65		60		60
Training		45		40		40		40
Actual		60		60		65		65

TESTING ORDER — **FIRST**

SECOND

Position Performance	Testing Order			
	FIRST		SECOND	
	DAY		NIGHT	
	Tray	Seq	Tray	Seq
Demo	PDF1/PDB1	35	PNF1/PNB1	35
Actual	ADF1/ADB1	10	ANF1/ANB1	10
Training	PDF2/PDB2	20	PNF2/PNB2	20
Actual	ADF2/ADB2	15	ANF2/ANB2	15
Training	PDF3/PDB3	25	PNF3/PNB3	25
Actual	ADF1/ADB1	15	ANF1/ANB1	15

DESIGN LAYOUT EXAMPLE

SUBJECT: 2 MIRROR: 1 MIRROR TEST ORDER: 2/1

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	NGT/FAR LN.		NGT/ADJ. LN.		DAY/ADJ. LN.		DAY/FAR LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LFMN	09	LAMN	09	LAMD	09	LFMD	09
Actual		60		65		65		65
Training		45		45		45		40
Actual		65		60		60		65
Training		40		40		45		40
Actual		60		65		60		65

TESTING ORDER — FIRST / SECOND

Position Performance	Testing Order			
	FIRST		SECOND	
	NIGHT		DAY	
	Tray	Seq	Tray	Seq
Demo	PNF1/PNB1	30	PDF1/PDB1	30
Actual	ANF2/ANB2	15	ADF2/ADB2	15
Training	PNF3/PNB3	20	PDF3/PDB3	20
Actual	ANF1/ANB1	15	ADF1/ADB1	15
Training	PNF2/PNB2	25	PDF2/PDB2	25
Actual	ANF2/ANB2	10	ADF2/ADB2	10

SUBJECT: 3 MIRROR: 1 MIRROR TEST ORDER: 1/2

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	DAY/FAR LN.		DAY/ADJ. LN.		NGT/FAR LN.		NGT/ADJ. LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LFMD	09	LAMD	09	LFMN	09	LAMN	09
Actual		60		65		60		65
Training		40		40		40		40
Actual		65		60		65		60
Training		45		45		45		45
Actual		60		65		60		65

TESTING ORDER — **FIRST**

Position Performance	Testing Order			
	FIRST		SECOND	
	DAY		NIGHT	
	Tray	Seq	Tray	Seq
Demo	PDF1/PDB1	35	PNF1/PNB1	35
Actual	ADF1/ADB1	15	ANF1/ANB1	15
Training	PDF2/PDB2	25	PNF2/PNB2	25
Actual	ADF2/ADB2	10	ANF2/ANB2	10
Training	PDF3/PDB3	20	PNF3/PNB3	20
Actual	ADF1/ADB1	10	ANF1/ANB1	10

ORDER SECOND

DESIGN LAYOUT EXAMPLE

SUBJECT: 3 MIRROR: 2 MIRROR TEST ORDER: 1/2

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	NGT/ADJ. LN.		NGT/FAR LN.		DAY/FAR. LN.		DAY/ADJ. LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LAMN	09	LFMN	09	LFMD	09	LAMD	09
Actual		65		60		65		60
Training		45		40		45		40
Actual		60		60		60		60
Training		40		45		40		45
Actual		65		65		65		65

TESTING ORDER: FIRST, SECOND

Position Performance	Testing Order				
	FIRST			SECOND	
	NIGHT			DAY	
	Tray	Seq		Tray	Seq
Demo	PNF1/PNB1	30		PDF1/PDB1	30
Actual	ANF2/ANB2	15		ADF2/ADB2	15
Training	PNF2/PNB2	20		PDF2/PDB2	20
Actual	ANF1/ANB1	15		ADF1/ADB1	15
Training	PNF3/PNB3	25		PDF3/PDB3	25
Actual	ANF2/ANB2	10		ADF2/ADB2	10

DESIGN LAYOUT EXAMPLE

SUBJECT: 4 MIRROR: 1 MIRROR TEST ORDER: 1/2

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	NGT/ADJ. LN.		NGT/FAR LN.		DAY/ADJ. LN.		DAY/FAR LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LAMN	09	LFMN	09	LAMD	09	LFMD	09
Actual		60		65		60		65
Training		45		40		40		45
Actual		60		60		65		60
Training		45		45		45		40
Actual		65		65		60		65

TESTING ORDER — FIRST

Position Performance	Testing Order			
	FIRST		SECOND	
	NIGHT		DAY	
	Tray	Seq	Tray	Seq
Demo	PNF1/PNB1	30	PDF1/PDB1	30
Actual	ANF2/ANB2	10	ADF2/ADB2	10
Training	PNF3/PNB3	20	PDF3/PDB3	20
Actual	ANF1/ANB1	15	ADF1/ADB1	15
Training	PNF2/PNB2	20	PDF2/PDB2	20
Actual	ANF2/ANB2	15	ADF2/ADB2	10

TESTING ORDER — SECOND

SUBJECT: 4 MIRROR: 2 MIRROR TEST ORDER: 1/2

Test Type

Motion Performance	Testing Order							
	FIRST		SECOND		THIRD		FOURTH	
	DAY/ADJ. LN.		DAY/FAR LN.		NGT/FAR LN.		NGT/ADJ. LN.	
	Tray	Seq	Tray	Seq	Tray	Seq	Tray	Seq
Demo	LAMD	09	LFMD	09	LFMN	09	LAMN	09
Actual		65		60		60		65
Training		40		45		45		45
Actual		60		60		65		65
Training		45		40		40		45
Actual		65		65		60		65

TESTING ORDER

FIRST

SECOND

Position Performance	Testing Order			
	FIRST		SECOND	
	DAY		NIGHT	
	Tray	Seq	Tray	Seq
Demo	PDF1/PDB1	35	PNF1/PNB1	35
Actual	ADF1/ADB1	10	ANF1/ANB1	10
Training	PDF3/PDB3	25	PNF3/PNB3	25
Actual	ADF2/ADB2	10	ANF2/ANB2	10
Training	PDF2/PDB2	25	PNF2/PNB2	25
Actual	ADF1/ADB1	15	ANF1/ANB1	15

4.4 Facility Setup

4.4.1 Overview

Figures 4.2 and 4.3 illustrate the mock-up and test facility equipment arrangement. Figure 4.2 shows the vehicle mock-up and mirror locations and projector and screen. Figure 4.3 shows the experimenter's control station.
The facility setup section is comprised of the following sub-sections:

Facility Arrangement (4.4.2)
Equipment Requirements (4.4.3)
Facility/Equipment Preparation and Setup (4.4.4)

4.4.2 Facility Arrangement

The facility and equipment arrangement are the same as used for characteristics measurement described in Volume I with the following modifications;

The projection screen is rotated 15 degrees as shown in Figures 4.4 and 4.5 for left and right mirror test locations, respectively.

2) The projector is located perpendicular to the screen at a distance which provides the proper target vehicle scale and position on the screen relative to the observer and mirror of interest (See Figures 4.4 and 4.5). The proper scale presents the user a projected image size, when using a specific target vehicle plane mirror, which is equivalent to that observed in the real world.

4.4.3 Equipment Requirements

The following equipment is required for Simulated-Use Testing:

1) Facility as described in Volume I;
2) Stimulus slides of target vehicle;
3) Rain Simulation Equipment (See Appendix H);
4) Apple II computer and Interface and Response Panel(See Appendix).

4.4.4 Facility/Equipment Preparation and Setup

The facility and equipment is set up as described in Volume I. The center eye position of the observer is located, the test mirror is installed and adjusted, the projection system and projector screen located and the computer system and response panel installed.

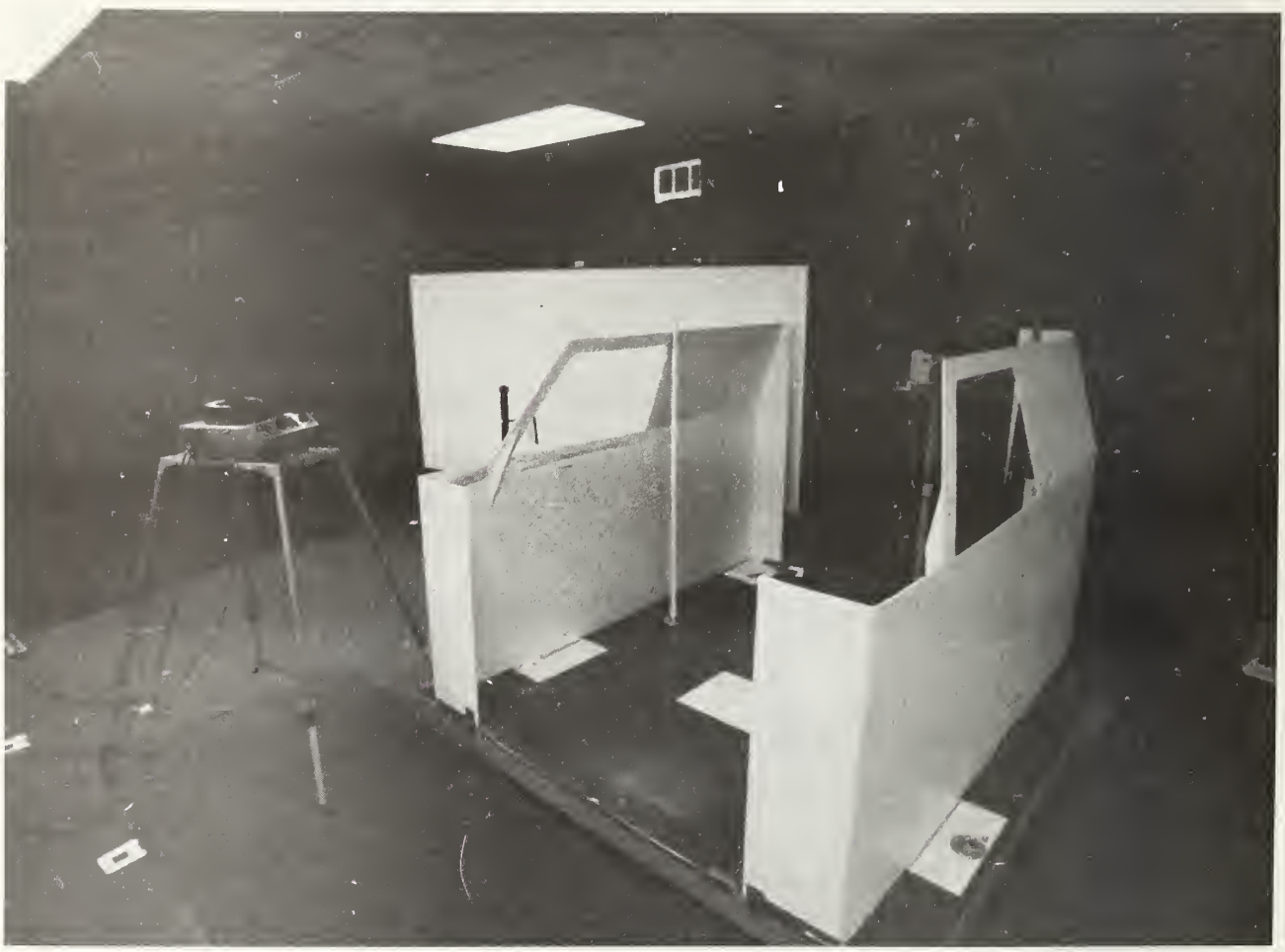


FIGURE 4.2 ILLUSTRATION OF TEST FACILITY EQUIPMENT ARRANGEMENT

FIGURE 4.3 ILLUSTRATION OF EXPERIMENTER STATION LAYOUT

4.4.4.1 Locate Eye Position

The location of the observer's center eye position is shown in Figures 4.4 and 4.5 for left and right door mount mirror locations, respectively. Other eye and mirror location geometries may be used.

4.4.4.2 Attach Test Mirror

The test mirror is attached to the mounting post as shown in Figures 4.4 and 4.5.

4.4.4.3 Locate Projection Screen

The 4 x 8 foot projection screen is located relative to other elements as shown in Figures 4.4 and 4.5. The screen is located 38.25 inches (X dimension) behind the eye point at the mock-up vehicle edge. The screen is rotated 15 degrees (as shown) about the intersection of the vehicle edge line and screen surface.

4.4.4.4 Locate Projector

The projector is located, perpendicular to the screen, so that the target vehicle images projected onto the screen are to the proper scale and in their proper location as if viewed by a plane mirror located on the left or right side of the observers' vehicle. The approximate distance is shown in the figures.

The following steps are followed to locate and align the projector/screen so as to obtain the proper image size and position on the screen.

Step 1: Place test slide containing the position calibration image in the projector and project onto screen. Locate the calibration image (intersection of vertical line and lower horizontal line) so that it is 34.5 inches above the ground and 16.5 inches from the vehicle edge (see Figure 4.6). This aligns the projector vertically and horizontally so that target vehicle images fall on the geometrically proper screen location and are located properly for viewing by the observer/mirror.

Step 2: Place target vehicle image size calibration slide in tray and project. The target vehicle size calibration slide is any slide showing the single white vehicle at the 4 car length distance in the adjacent lane (see Figure 4.7). Measure the horizontal black grill area containing the head lamps. It should measure 8.5 inches for right mirrors (6.8 inches for left mirrors) in order that all target vehicles will be projected to proper size for their

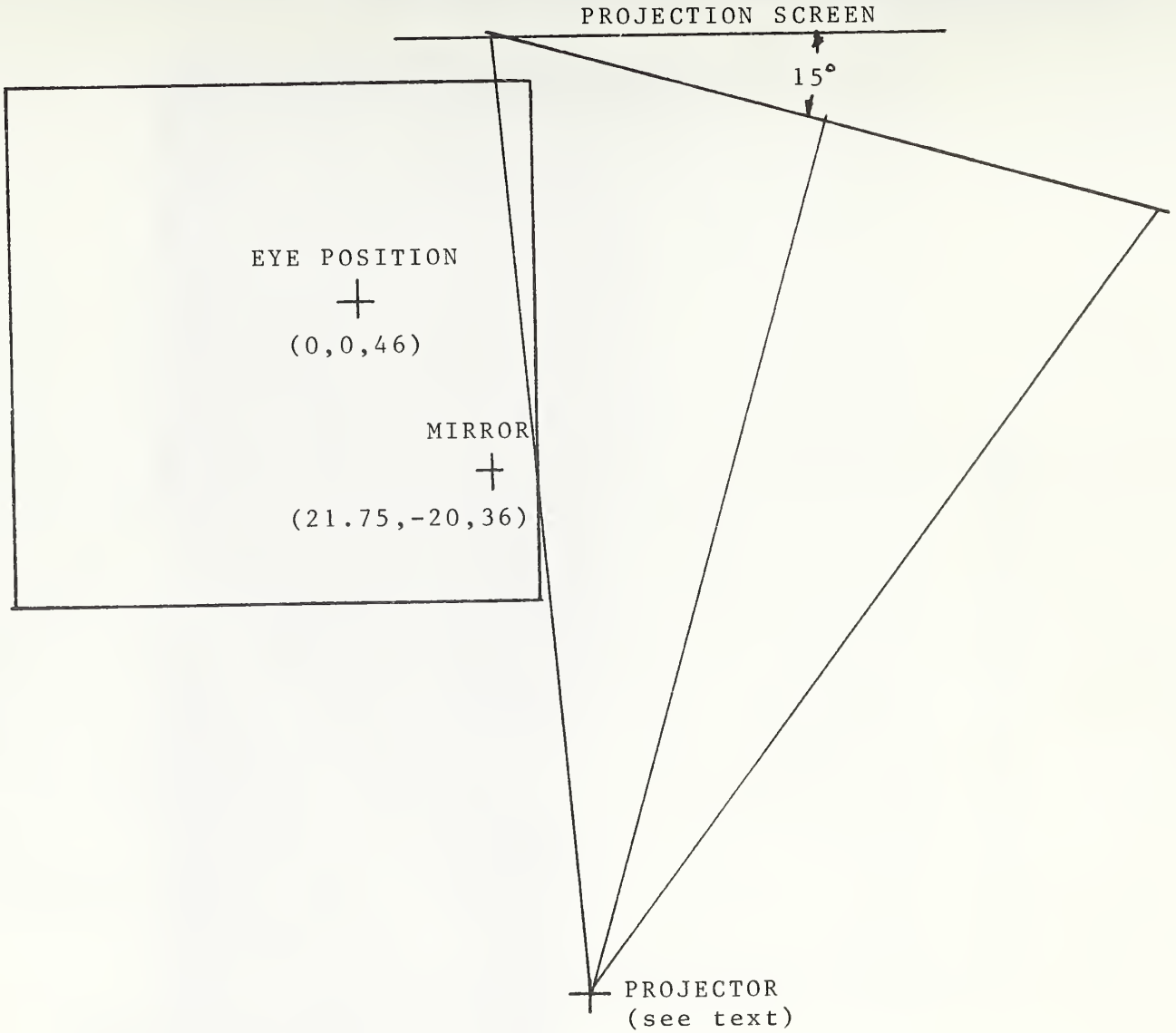


FIGURE 4.4 EQUIPMENT ARRANGEMENT FOR LEFT SIDE MIRROR SIMULATED-USE PERFORMANCE TESTS

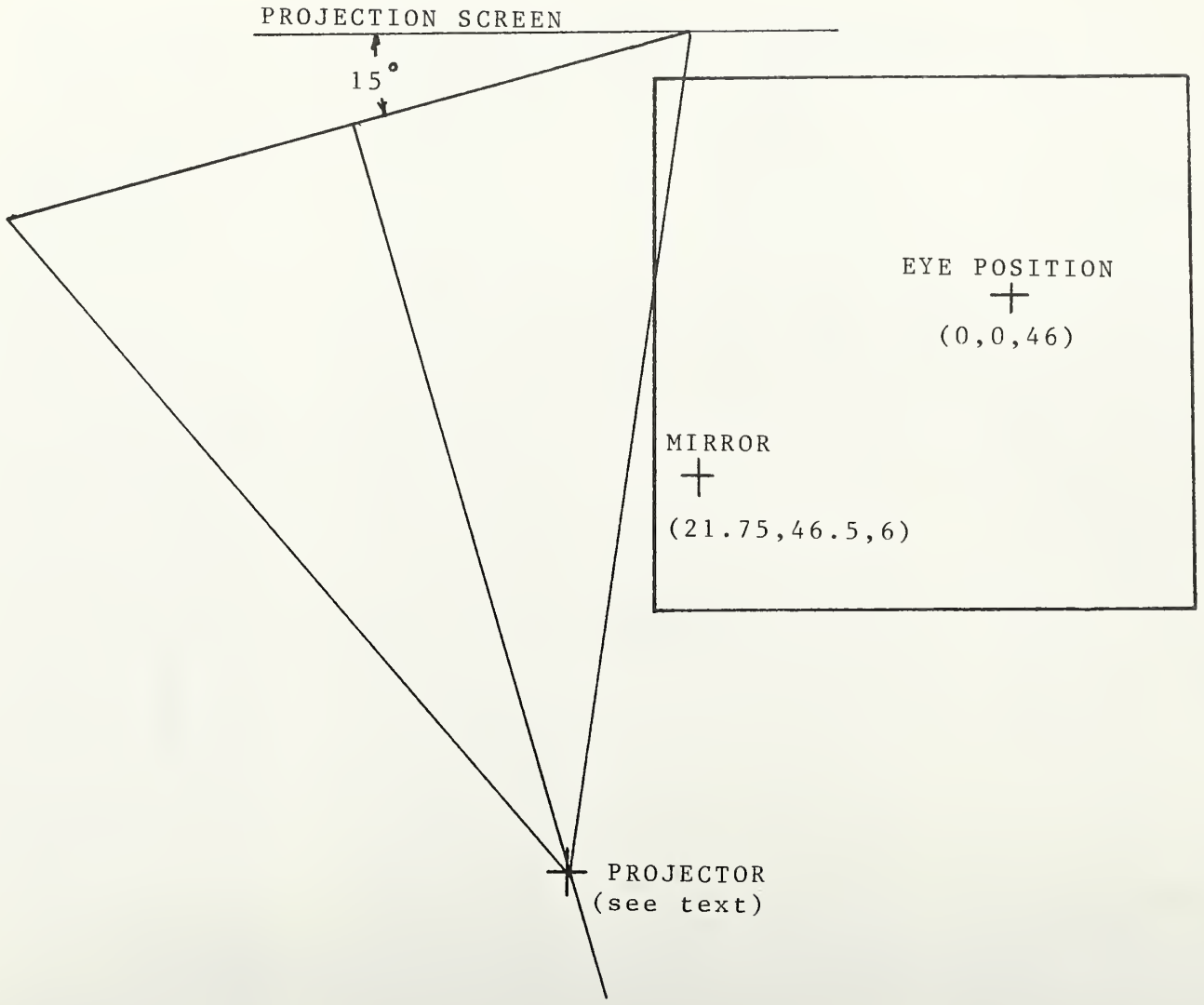


FIGURE 4.5 EQUIPMENT ARRANGEMENT FOR RIGHT SIDE MIRROR SIMULATED-USE PERFORMANCE TESTS.

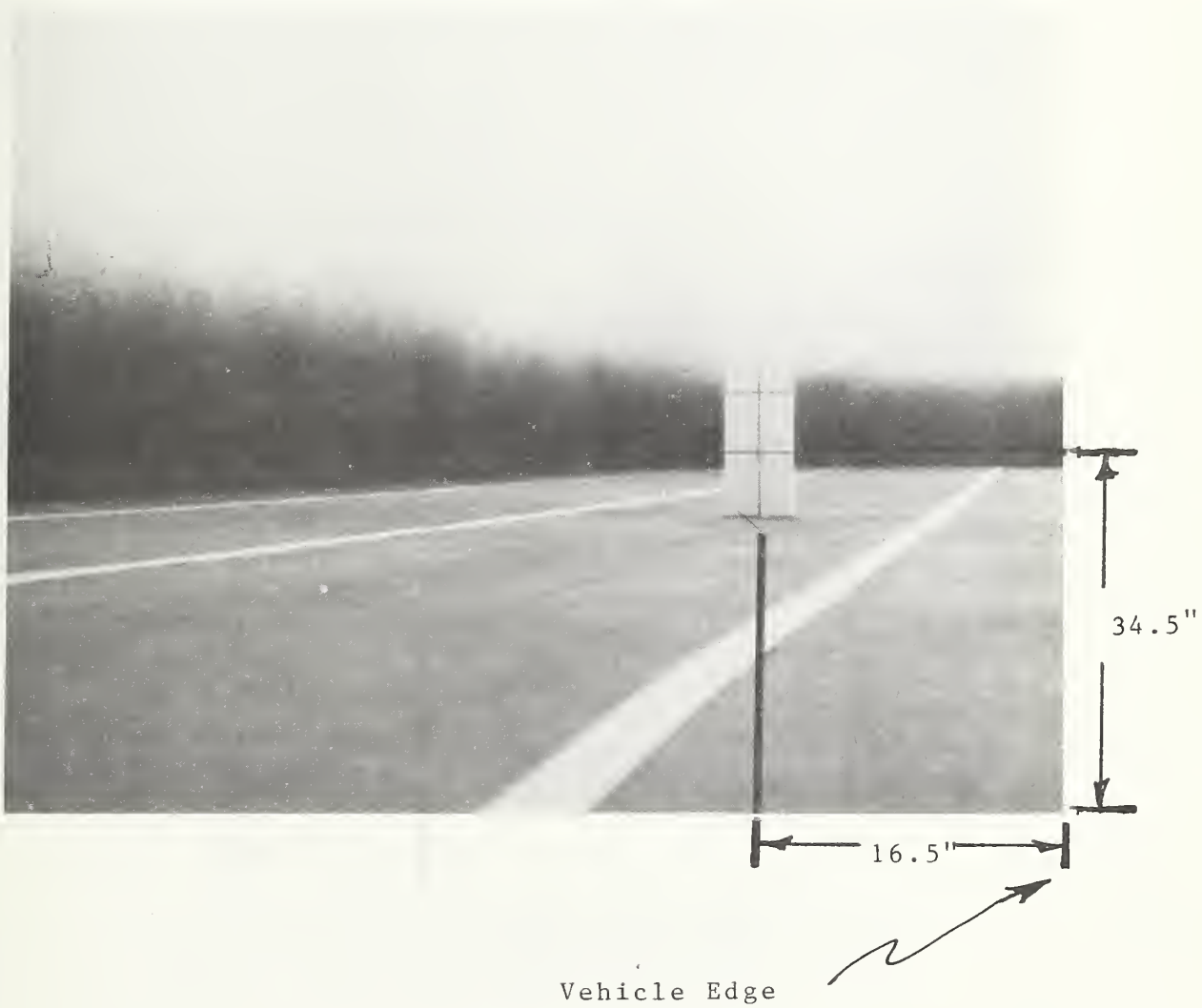


FIGURE 4.6 ALIGNMENT OF PROJECTED TARGET VEHICLE IMAGE ON SCREEN

L= 6.8 INCHES FOR LEFT SIDE DOOR MIRROR
R= 8.5 INCHES FOR RIGHT SIDE DOOR MIRROR

FIGURE 4.7 ADJUSTMENT OF IMAGE SIZE TO OBTAIN PROPER TARGET VEHICLE SCALE

relative distance.

Step 3: Re-check position of calibration image vertical and horizontal line. Level projector and screen.

4.4.4.5 Connect Projector/Computer/Response Controls

The Projector/Computer/Response Controls must be connected for automatic slide presentation and recording of motion performance responses. The steps are discussed in Appendix I.

4.4.4.6 Check Screen Illumination

With the projector and screen properly located, measure screen illumination without a slide in the projector. Figure 4.8 shows the correct illumination (foot-candles) at various screen positions. This will assure similar target image brightness.

4.4.4.7 Install Rain Simulation Equipment (If desired)

The rain simulation equipment/set-up (Appendix H) is primitive and difficult to work around without considerable modification.

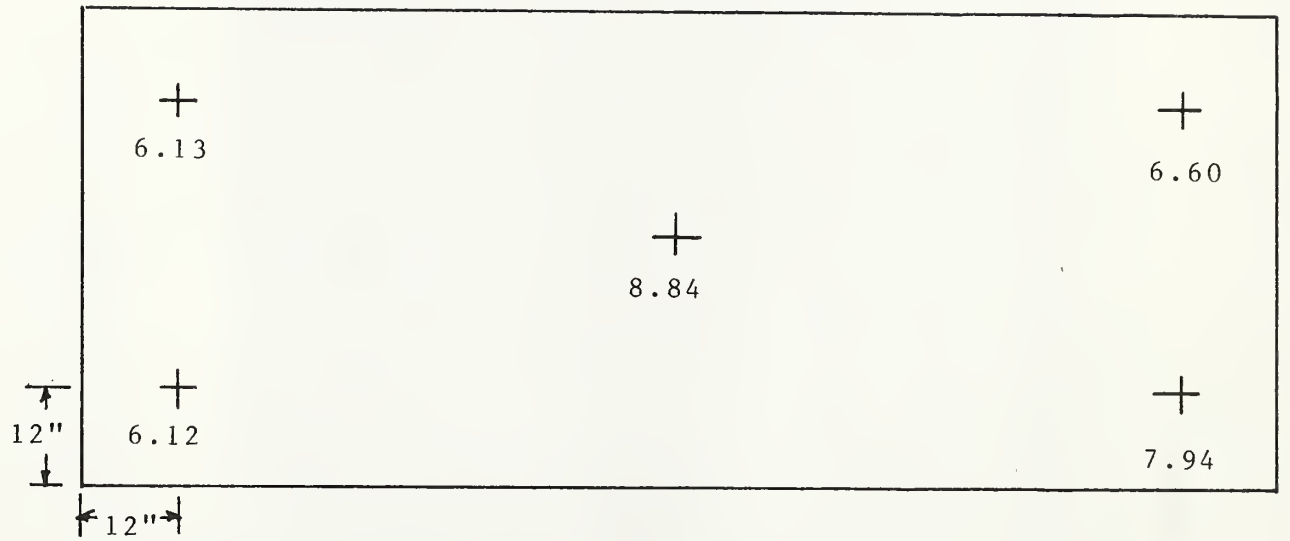


FIGURE 4.8 DISTRIBUTION OF PROJECTION SCREEN ILLUMINATION (FOOT-CANDLES)

(KODAK EKTAGRAPHIS PROJECTOR/BUHL F 2.5 LENS)

4.5 Running a Subject

4.5.1 Overview

The "running" of a subject is described in the following five sub-sections:

Preliminary Setup (4.5.2)
Computer Setup (4.5.3)
Motion Performance Testing (4.5.4)
Position Performance Testing (4.5.5)
Repeat for all Mirrors/Subjects (4.5.6)

4.5.2 Preliminary Setup

The preliminary setup involves six steps:

1) Attach appropriate mirror test device at designated point in the x,y,z coordinate system.

2) Level test device with respect to the horizontal axis.

3) Put appropriate slide tray onto projector.

4) Move to a slide at random and manually focus projector. Make sure projector is left in manual focus position.

5) Move tray to slide tray number 0.

6) Seat subject in vehicle mock-up and adjust eyepoint of subject to designated point in the x,y,z coordinate system. Attach seat belt and adjust.

4.5.3 Computer Setup

The computer setup involves six steps:

1) Turn on computer; (See Appendix I)
2) Put disk PROJ02 in drive.
3) Load file "PROJ02" by typing "LOAD PROJ2".
4) Run program "PROJ02" by typing "RUN".
5) Set tray to be used on slide tray number 0.
6) Type in "100" at the prompt for number of sequences to be run.

4.5.4 Motion Performance Testing

Motion Performance testing involves eight steps:

1) Read Introduction Instructions to subject.

Instructions for both Position and Motion Performance are found in Appendix K.

2) Demonstration: Read Demonstration Instructions to subject. Type in "09" at prompt for sequence to be run. Tray will be positioned for trial 1. Press return to begin trial 1. Trial will end; Press return to begin trial 2. Trial 2 will end. Note that the end of each testing segment motion response data will be printed.

3) Actual Test Segment: Use same slide tray. Read actual test instructions. Type in appropriate sequence number to be run (either "60" or "65"). Wait for slide tray to be positioned for trial 1. Begin trial by pressing return. Subject responds ending trial. Slide tray is automatically positioned for trial 2. This procedure is repeated for all nine trials. At end of nine trials response data is printed by the micro-computer.

4) Training Segment: Use same slide tray. Read training instructions to subject. Type in appropriate sequence number to be run (either "40" or "45"). Wait for slide tray to be positioned for trial 1. Begin trial by pressing return. After subject responds, both to response panel and verbally, give feedback by using data given in Appendix E. Repeat until all three trials are completed. Note that a "beep" is heard when the subject responds on panel and when the next trial is ready.

5) Repeat actual test for appropriate condition and sequence.

6) Repeat training and actual test segments one more time by implementing steps 4 and 5 again.

7) Repeat steps 1-5 again for the three remaining conditions.

8) Note that the beginning slide tray and trial numbers are shown on the CRT before each trial. As the trial proceeds slide tray numbers are shown on the computer screen to assure proper trials presentation to the subject. These can be followed and checked by using the data in Appendix E.

4.5.5 Position Performance Testing

Position Performance testing involves six steps:

1) Demonstration/training Segment: Choose appropriate slide tray according to previous design. Read demonstration/training instructions for condition to be tested--daytime or nighttime. Type in appropriate sequence to be run (either "30" or "35"). Wait for slide tray to be positioned for trial 1. Press return to begin trial 1. Subject will view slide and projector will be positioned for next trial. Precue subject for trials 1-4. Give feedback for trials 5-8. Note that information used for precued and feedback trials is found in Appendices F and G. At the end of each testing segment data will be printed. The printout is to be ignored as verbal responses are recorded manually.

2) Actual Test Segment: Select appropriate slide tray. Read Actual Test instructions for the same condition as was used in the training session just completed. Type in appropriate sequence to be run (either "10" or "15"). Wait for slide tray to be positioned for trial 1. Run subject through all 44 trials. Responses are manually recorded by the experimenter on the response form. Do not give precued or feedback information.

3) Training Segment: Choose appropriate slide tray. Read training instructions for the same condition as was used in the actual test segment just completed. Type in appropriate sequence to be run (either "20" or "25"). Precue subject for trials 1-16. Give feedback for trials 16-32.

4) Actual Test Segment: Repeat actual test segment for appropriate condition, tray and sequence.

5) Repeat training and actual test segments one more time by implementing steps 5-6.

6) Repeat steps 1-5 for the remaining condition, either day or night.

4.5.6 Repeat for all Mirrors/Subjects

Motion and Position testing is then repeated for all mirrors for a single subject. The total procedure is then repeated for all subjects. If the test design includes another mirror position, all tests must be repeated for the new position.

4.5.7 Overall Run Times

Approximate run times are given below. A break of 5-10 minutes should be given every half hour.

4.5.7.1 Motion Performance:

	Time (min.)	Times given	Total
Demonstration Segment (2 trls.)	5	1	5
Training Segment: (3 trls.)	5	2	10
Actual Test Segment: (9 trls.)	10	3	30
Total*			45

*Per subject/condition/mirror/location

4.5.7.2 Position Performance:

	Time (min.)	Times given	Total
Demo/Training Segment: (8 trials)	5	1	5
Training Segment: (32 trials)	8	2	16
Actual Test Segment: (44 trls.)	8	3	24
Total*			45

*Per subject/condition/mirror/location

4.6 Data Analysis

4.6.1 Overview

Three levels of data analysis are required for both Motion and Position Performance results:

1) the raw data level
2) the input level
3) the analyze, sort and average level

A final performance summary level combines the Motion and Position Performance results.

4.6.2 Motion Performance

4.6.2.1 Raw Data

Raw data are printed directly from the Apple II plus which also presents the trial sequences since subjects make responses to a response panel connected to the computer. If mistakes (incorrect button pushed) are made by the subject, correct responses are recorded manually on the response form. Response data include the number of slides viewed and motion direction response.

4.6.2.2 Input

Raw data are entered into specific spreadsheet templates for analysis. Analysis is done using an Apple Macintosh with a modified Excel spreadsheet program. There are separate templates for each sequence order, either 60 or 65 described earlier. These templates can be used for all conditions.

4.6.2.3 Analyze, Sort and Average

Subject responses should be compared to actual directions of motion and an overall weight score obtained. A maximum weight score would be 1.00 indicating a correct response. The overall weight reflects two sub-weights. The first is the direction weight. This compares the actual direction of motion (same, further or closer) to the response direction of motion (same, further or closer). Nine possible combinations exist with the weight reflecting the severity of error. A table of the weights is given in Figure 4.1.

The second motion performance weight is the number of looks weight. The raw data include information as to the total number of slides viewed, including blanks, before the subject gives a response. This can be transformed into the number of looks at the vehicle stimuli by way of Table 4.2.

The size of the weight decreases as the number of looks increases as shown in Table 4.3. An overall motion sub-score is then calculated by multiplying the direction weight by the number of looks weight.

Each template, which contains data for one mirror and condition, is then sorted, in ascending order, first by distance of starting target position (either 3, 6 or 9 car lengths back) and second by direction of motion. The result gives a standard format for obtaining averages over the conditions and random sequences used. These averages are obtained by averaging across subjects for each of the four motion performance conditions. Specific averages are then computed for each of the starting distances, 3, 6 or 9 car lengths back.

Table 4.1: Direction Weight

Actual Direction	Judged Direction	Weight
Same	Same	1.00
Closer	Closer	1.00
Further	Further	1.00
Same	Closer	0.75
Further	Same	0.75
Further	Closer	0.50
Same	Further	0.50
Closer	Same	0.50
Closer	Further	0.25

Table 4.2: Number of Slides Viewed (Transforms No. Slides to No. Looks at Target)

# Slides Viewed	# Looks at Target
3-4	1
5-6	2
7-8	3
9-10	4
11-12	5
13-14	6
15-16	7
17-18	8

Table 4.3: Number of Looks Weight

Number of Looks	Weight
1	1.0
2	0.9
3	0.8
4	0.7
5	0.6
6	0.5
7	0.4
8	0.3

4.6.3 Position Performance

4.6.3.1 Raw Data

Raw data are recorded manually by the experimenter from subject verbal responses. Daytime data include lane, either near (N) or far (F), and number of car lengths back. Nighttime data include only number of car lengths back excluding lane position.

4.6.3.2 Input

Raw data are also entered into spreadsheet templates. For position there are separate templates for day and night. Within day and night separate templates exist for the actual testing tray used combined with the sequence order used, either 10 or 15 described earlier.

4.6.3.3 Analyze, sort and average

For the daytime position condition three sub-weights give rise to an overall position sub-score with the maximum weight score equal to 1.00. The first weight, the position lane error weight, compares the actual lane of the target to the response lane. Three possibilities exist with weights reflecting severity of error as shown in Table 4.4.

The second weight, the distance error direction weight, is based on whether the subject judged the target as closer than actual, further than actual or at the correct distance back. These are shown in Table 4.5.

The third weight, the distance error magnitude weight, is based on the absolute error in judging the number of car lengths back. The greater the error the more severe the weight as shown in Table 4.6. The overall weight for daytime position performance equals these product of the three weights.

Each template, for daytime, which contains information for one random slide tray and sequence, is then sorted, in ascending order, first by type of target (single and multiple), second by lane (adjacent and far) and third by distance (0-10 car lengths). The result standardizes weight scores for comparison. Averages are computed across all daytime actual tests for all levels of training. Specific averages, such as a combined near and far lane average, can also be computed easily.

Night position performance is based on only two sub-weights. This is because the response given by the subject is limited to the distance (number of car lengths back) of the closest vehicle. Since no lane response is given, the lane positon error weight is dropped leaving only the distance error direction weight and the distance error magnitude weight. The overall weight score is the product of these two weights.

Each template for nighttime, which contains information for one random slide tray and sequence, is then sorted, in ascending order, first by type of target (single and multiple) and second by distance (0-10 car lengths). The result standardardizes weight scores for comparison. Averages are computed in a manner similar to those for daytime position performance.

Table 4.4: Position Performance: Position Error Weight

Type of Error	Actual Lane	Judged Lane	Weight
None	Far	Far	1.00
Positive	Far	Adjacent	0.75
Negative	Adjacent	Far	0.25

Table 4.5: Position Performance: Distance Error Direction Weight

Type of Error	How Judged	Weight
None	Correct	1.00
Positive	Closer than actual	0.80
Negative	Further than actual	0.30

Table 4.6: Position Performance: Distance Error Magnitude Weight

No. of car lengths between actual and judged distances (absolute difference)	Weight
0	1.00
1	0.90
2	0.80
3	0.70
4	0.60
5	0.50
6	0.40
7	0.30

4.6.4 Performance Summary

Motion and Position Performance scores are combined by multiplying their weight and sub-scores. All Position Performance distances are represented with the Motion Performance weights at three distances (3, 6, and 9 car lengths) being distributed as follows: 3 car length distance weights are applied to Position distances 1-4; 6 car length distance weights are applied to Position distances 5-7; 9 car length distance weights are applied to Position distances 8-10.

Maximum possible scores, or importance scores, are then multiplied by combined position/motion sub-scores for each lane and number of car lengths back. These are shown in Table 4.7. The result is a total weighted Figure of Merit (FOM) score.

This score is then cumulated from 10 to 0 car lengths. The maximum possible score is cumulated in the same manner. Finally, the percent of the maximum possible cumulative score is obtained. Section 3.2.10 provides an overview of the overall combining and weighting process and section 4.6.6 provides a detailed description of the process.

Table 4.7: Maximum Possible Score (Importance) Weights

Lane	Distance (# car lengths)	Importance Weight*
Adjacent	0	90
	1	90
	2	75
	3	55
	4	45
	5	30
	6	20
	7	10
	8	5
	9	3
	10	1
Far	0	45
	1	45
	2	40
	3	35
	4	25
	5	10
	6	3
	7	1
	8	0
	9	0
	10	0

* See Section 3.0 for a discussion of the Importance Weight.

4.6.5 Plotting Data

Resulting performance summary data are plotted for various conditions to compare specific variables, ie. testing level 0 compared to testing level 1.

4.6.6 Example of Data Analysis

4.6.6.1 Overview

Motion and Position Performance data are analyzed separately due to their task differences. Within Motion Performance all possible conditions tested are analyzed in the same manner. Within Position Performance daytime and nighttime conditions are analyzed differently due to the difference in tasks described earlier. The sub-sections which describe data analysis are as follows:

Motion Performance Analysis (4.6.6.2)
Position Performance: Daytime Analysis (4.6.6.3)
Position Performance: Nighttime Analysis (4.6.6.4)
Performance Summary Analysis (4.6.6.5)
Example of Plotted Data (4.6.6.6)

4.6.6.2 Motion Performance

Raw data are printed directly from an Apple II plus which also controlled trial sequences. The form of the output is shown in Figure 4.9. Sequence number (SEQ), trial number (TRL), slide tray number (TRY), number of slides viewed (SLD), subject response (RSP) and correct response (COR) are given.

An example of the spreadsheet, set up for entering data, is shown in Figure 4.10. Spaces for subject number (SUB), mirror tested (MIR), condition (COND), lane tested (LANE) and sequence (SEQ) are available. Subjects range from 1-6; mirror 1 = non-spherical curved (V); mirror 2 = 20" convex; lane 3 = adjacent lane; lane 4 = far lane.

Constant columns within the spreadsheet itself are trial number (TRL), starting distance of target vehicle (DIS), and direction of target vehicle (DIR). Direction 1 = closer; direction 2 = same; direction 3 = further. Columns D and E are subject response (RESP.) and number of slides viewed (#SLD) respectively. These are entered from the raw data described earlier. Columns F - K are computed from previous columns and are described below.

Column F is the number of looks the subject made of the target vehicle. Column H, the number of looks weight (L WT), is computed from Column F. Column G is the motion direc-

SEQ	TRL	TRY	SLD	RSP	COR	
09	1	43	42	0	3	DEMONSTRATION
09	2	0	43	0	1	

SEQ	TRL	TRY	SLD	RSP	COR	
45	1	13	12	2	2	PRACTICE
45	2	41	16	3	3	
45	3	20	17	0	1	

SEQ	TRL	TRY	SLD	RSP	COR	
60	1	27	14	2	3	
60	2	25	20	2	2	
60	3	42	17	0	3	
60	4	45	9	1	3	ACTUAL TEST
60	5	37	14	1	2	
60	6	22	17	0	1	
60	7	17	10	1	1	
60	8	13	18	1	2	
60	9	7	8	1	1	

SEQ	TRL	TRY	SLD	RSP	COR	
09	1	43	42	0	3	DEMONSTRATION
09	2	0	43	0	1	

SEQ	TRL	TRY	SLD	RSP	COR	
40	1	29	16	2	3	
40	2	29	10	1	1	PRACTICE
40	3	25	20	2	2	

SEQ	TRL	TRY	SLD	RSP	COR	
65	1	25	16	2	2	
65	2	20	7	1	1	
65	3	5	10	1	1	
65	4	13	20	2	2	
65	5	29	16	3	3	ACTUAL TEST
65	6	42	17	0	3	
65	7	22	17	0	1	
65	8	37	22	0	2	
65	9	41	4	1	3	

FIGURE 4.9 EXAMPLE PRINTOUT FOR MOTION TESTS

	A	B	C	D	E	F	G	H	I	J	K
1	SUB:	MIR:	COND:	LANE:	SEQ:						
2	3	1	1	3	65						
3											
4	TRIAL	DIS.	DIR.	RESP.	#SLD	# LKS	DI WT	L WT	W SC	MX SC	OB SC
5	1	6	2	2	16	7	1.00	0.40	**0.40**	20.00	8.00
6	2	6	1	1	9	4	1.00	0.70	**0.70**	20.00	14.00
7	3	3	1	1	5	2	1.00	0.90	**0.90**	55.00	49.50
8	4	3	2	2	12	5	1.00	0.60	**0.60**	55.00	33.00
9	5	3	3	3	9	4	1.00	0.70	**0.70**	55.00	38.50
10	6	6	3	3	8	3	1.00	0.80	**0.80**	20.00	16.00
11	7	9	1	1	16	7	1.00	0.40	**0.40**	3.00	1.20
12	8	9	2	2	14	6	1.00	0.50	**0.50**	3.00	1.50
13	9	9	3	3	9	4	1.00	0.70	**0.70**	3.00	2.10

FIGURE 4.10 EXAMPLE OF MOTION RAIN DATA SPREADSHEET

tion weight (DI WT). In all trials in this example the subject correctly judged the direction of motion and therefore received a weight of 1.00. Column I is the weighted score; it is the product of the direction weight, (column G) multiplied by the number of looks weight, (column H).

Columns J and K are the maximum possible Importance weighted scores (MX SC) and obtained scores (OB SC) respectively. These are shown for illustrative purposes and were not used in further calculations. The obtained score, column K, is the weighted score, column I, multiplied by the maximum possible score, column J.

After all data is entered for a particular mirror and condition the data are sorted, in ascending order, first on vehicle starting distance, column B, and second on direction, column C. The result is shown in Figure 4.11. A spreadsheet with averages for all subjects for the condition presented, daytime, adjacent lane, non-spherical (V) mirror, is shown in Figure 4.12. Averages for the three starting distances, either 3, 6 or 9 car lengths, is given.

4.6.6.3 Position Performance: Daytime Condition

Raw data for Position Performance is recorded manually by the experimenter from subject verbal responses. Responses are recorded on the form shown in Figure 4.13. Subject information is also documented. On each trial response lane position, either near lane (N) or far lane (F), and number of car lengths back (from 0 - 10) were recorded. This data is then entered into another spreadsheet used for analyzing Position Performance data.

An example of a daytime position performance spreadsheet, as used when entering data, is shown in Figure 4.14. Subject number (SUB), mirror tested (MIR), condition tested (COND), slide tray number (TRAY) and sequence number (SEQ) are indicated on the top of the page. Condition 1 = daytime; condition 2 = nighttime. Two trays are available for both day and night. Sequence numbers 10 and 15 can be used.

Columns A - D contain the constants--trial number (TRL), single or multiple target (S/M), actual lane of target (ALN) and the actual distance of the target (A DIS) respectively. Single targets are coded as 1; multiple targets are coded as 2. Adjacent lane targets are coded as 3; far lane targets as 4. Actual distances can vary from 0 - 10.

Column E and F are used for subject response data as taken from the raw data previously described. Column G is the absolute difference (ABS D) between the actual distance, column D, and the response distance, column F. Column H is the

	A	B	C	D	E	F	G	H	I	J	K
1	SUB:	MIR:	COND:	LANE:	SEQ:						
2	3	1	1	3	65						
3											
4	TRIAL	DIS.	DIR.	RESP.	#SLD	# LKS	DI WT	L WT	W SC	MX SC	OB SC
5	3	3	1	1	5	2	1.00	0.90	**0.90**	55.00	49.50
6	4	3	2	2	12	5	1.00	0.60	**0.60**	55.00	33.00
7	5	3	3	3	9	4	1.00	0.70	**0.70**	55.00	38.50
8	2	6	1	1	9	4	1.00	0.70	**0.70**	20.00	14.00
9	1	6	2	2	16	7	1.00	0.40	**0.40**	20.00	8.00
10	6	6	3	3	8	3	1.00	0.80	**0.80**	20.00	16.00
11	7	9	1	1	16	7	1.00	0.40	**0.40**	3.00	1.20
12	8	9	2	2	14	6	1.00	0.50	**0.50**	3.00	1.50
13	9	9	3	3	9	4	1.00	0.70	**0.70**	3.00	2.10

FIGURE 4.11 MOTION DATA SPREADSHEET SORTED BY DISTANCE, DIRECTION

	A	B	C	D	E	F	G	H
1	SUM: MOTION/ DAY/ ADJACENT/ VOLVO							
2								
3	DIS.	DIR.		WTS. AVERAGE			AVER/DISTANCE	
4	3	1		0.72				
5	3	2		0.65				
6	3	3		0.60			3	0.65
7	6	1		0.67				
8	6	2		0.44				
9	6	3		0.46			6	0.52
10	9	1		0.53				
11	9	2		0.46				
12	9	3		0.54			9	0.51

FIGURE 4.12 SPREADSHEET ILLUSTRATING AVERAGE MOTION SCORE FOR ALL SUBJECTS

FIGURE 4.13 SAMPLE OF DAYTIME POSITION RESPONSE RECORDING FORM

RESPONSE SCORE FORM

PRACTICE / (ACTUAL) _____

SUBJECT NO. 1

(POSITION) / MOTION _____

MIRROR: 40" C

CONDITION: DAYLIGHT

SEQUENCE NO. 15 / ACT #2

DATE: _____

TIME: _____

TRIAL NO.	RESPONSE
1	NEAR 4
2	FAR 3
3	N 2
4	N 5
5	F 6
6	N 4
7	F 4
8	F 7
9	F 0
10	N 3
11	N 1
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	
41	
42	F 7
43	F 1
44	N 6

FIGURE 4.14 SAMPLE POSITION PERFORMANCE RAW DATA SPREADSHEET

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	SUB:	MIR:	COND:	TRAY:	SEQ:									
2	1	1	1	2	15									
3														
4	TRL	S/M	ALN	ADIS	RLN	RDIS	ABS. D	SIN D	MAGN.	POS W	DIR W	WTS S	MAX S	OBT S
5	1	2	3	4	3	4	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
6	2	2	4	2	4	3	1	-1	0.90	1.00	0.30	**0.27**	40.00	10.80
7	3	2	3	1	3	2	1	-1	0.90	1.00	0.30	**0.27**	90.00	24.30
8	4	2	3	9	3	5	4	4	0.60	1.00	0.80	**0.48**	3.00	1.44
9	5	2	4	6	4	6	0	0	1.00	1.00	1.00	**1.00**	3.00	3.00
10	6	1	3	8	3	4	4	4	0.60	1.00	0.80	**0.48**	5.00	2.40
11	7	1	4	5	4	4	1	1	0.90	1.00	0.80	**0.72**	10.00	7.20
12	8	1	4	8	4	7	1	1	0.90	1.00	0.80	**0.72**	0.00	0.00
13	9	1	4	1	4	0	1	1	0.90	1.00	0.80	**0.72**	45.00	32.40
14	10	1	3	5	3	3	2	2	0.80	1.00	0.80	**0.64**	30.00	19.20
15	11	2	4	1	3	1	0	0	1.00	0.75	1.00	**0.75**	45.00	33.75
16	12	2	4	8	4	9	1	-1	0.90	1.00	0.30	**0.27**	0.00	0.00
17	13	1	4	3	4	3	0	0	1.00	1.00	1.00	**1.00**	35.00	35.00
18	14	2	4	0	4	0	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
19	15	2	3	5	3	3	2	2	0.80	1.00	0.80	**0.64**	30.00	19.20
20	16	1	3	10	3	6	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48
21	17	2	3	8	3	6	2	2	0.80	1.00	0.80	**0.64**	5.00	3.20
22	18	1	3	7	3	4	3	3	0.70	1.00	0.80	**0.56**	10.00	5.60
23	19	2	4	7	4	7	0	0	1.00	1.00	1.00	**1.00**	1.00	1.00
24	20	2	3	2	3	2	0	0	1.00	1.00	1.00	**1.00**	75.00	75.00
25	21	2	4	10	4	8	2	2	0.80	1.00	0.80	**0.64**	0.00	0.00
26	22	2	3	6	3	4	2	2	0.80	1.00	0.80	**0.64**	20.00	12.80
27	23	1	3	2	3	2	0	0	1.00	1.00	1.00	**1.00**	75.00	75.00
28	24	2	4	5	4	5	0	0	1.00	1.00	1.00	**1.00**	10.00	10.00
29	25	2	3	0	3	1	1	-1	0.90	1.00	0.30	**0.27**	90.00	24.30
30	26	1	4	6	4	4	2	2	0.80	1.00	0.80	**0.64**	3.00	1.92
31	27	1	4	4	4	3	1	1	0.90	1.00	0.80	**0.72**	25.00	18.00
32	28	1	3	6	3	4	2	2	0.80	1.00	0.80	**0.64**	20.00	12.80
33	29	1	3	0	3	0	0	0	1.00	1.00	1.00	**1.00**	90.00	90.00
34	30	1	4	7	4	3	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48
35	31	1	3	3	3	2	1	1	0.90	1.00	0.80	**0.72**	55.00	39.60
36	32	2	4	4	4	5	1	-1	0.90	1.00	0.30	**0.27**	25.00	6.75
37	33	1	4	0	4	0	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
38	34	2	4	3	4	2	1	1	0.90	1.00	0.80	**0.72**	35.00	25.20
39	35	1	4	9	4	6	3	3	0.70	1.00	0.80	**0.56**	0.00	0.00
40	36	1	4	10	4	9	1	1	0.90	1.00	0.80	**0.72**	0.00	0.00
41	37	1	3	1	4	1	0	0	1.00	0.25	1.00	**0.25**	90.00	22.50
42	38	2	3	7	3	4	3	3	0.70	1.00	0.80	**0.56**	10.00	5.60
43	39	2	3	3	3	3	0	0	1.00	1.00	1.00	**1.00**	55.00	55.00
44	40	1	3	4	3	3	1	1	0.90	1.00	0.80	**0.72**	45.00	32.40
45	41	1	3	9	3	4	5	5	0.50	1.00	0.80	**0.40**	3.00	1.20
46	42	2	4	9	4	7	2	2	0.80	1.00	0.80	**0.64**	0.00	0.00
47	43	1	4	2	4	1	1	1	0.90	1.00	0.80	**0.72**	40.00	28.80
48	44	2	3	10	3	6	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48

signed difference between these same columns. Column I - K are the three weights used for position performance scoring.

Column I is the distance error magnitude weight (MAGN). It is obtained by applying the absolute differences, found in column G, of the actual and judged distances, to the weighting values previously described. Column K is the distance error direction weight. It is obtained by determining the direction of error between the actual and judged distances; target judged closer than actual gives signed difference greater than 0; target judged further than actual gives signed difference less than 0; target judged equal to actual distance signed difference equals 0. Column J is the position error weight. It compares actual to response lane position, either adjacent or far lane. These weights are determined by comparing combinations of the 3 and 4 values in column C and E.

Column L contains the weight score. It is calculated by multiplying the weights in column J - L. This value is used in all further calculations. Column M is the maximum possible score obtainable (MAX S) and is calculated as in Motion Performance. Column N is the obtained score (OBT S). It is equal to the total weighted score multiplied by the maximum possible score. Columns M and N are shown for illustrative purposes.

After all data are entered for a particular mirror and condition the data are sorted in ascending order first on single/multiple target column (column B), second on the actual lane, (column C), and third on the actual distance, (column D). The result is shown in Figure 4.15 . All sequences for all subjects can be readily averaged based on the same conditions.

A spreadsheet with averages for all subjects for the condition presented, (daytime, non-spherical curved (V) mirror), is shown in Figure 4.16. Here averages for single targets for both lanes and multiple targets for both lanes are also given.

4.6.6.4 Position Performance: Night Condition

Raw data for Night Position Performance is recorded manually by the experimenter from subject verbal responses. Responses are recorded on the form shown in Figure 4.17. On each trial only the number of car lengths back (varying from 0 - 10) is recorded. This data is then entered into another spreadsheet used for analyzing Nighttime Position Performance data.

FIGURE 4.15 EXAMPLE OF POSITION DATA SORTED BY CONDITIONS

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	SUB:	MIR:	COND:	TRAY:	SEQ:									
2	1	1	1	2	15									
3														
4	TRL	S/M	ALN	ADIS	RLN	RDIS	ABS. D	SIN D	MAGN.	POS W	DIR W	WTS S	MAX S	OBT S
5	29	1	3	0	3	0	0	0	1.00	1.00	1.00	**1.00**	90.00	90.00
6	37	1	3	1	4	1	0	0	1.00	0.25	1.00	**0.25**	90.00	22.50
7	23	1	3	2	3	2	0	0	1.00	1.00	1.00	**1.00**	75.00	75.00
8	31	1	3	3	3	2	1	1	0.90	1.00	0.80	**0.72**	55.00	39.60
9	40	1	3	4	3	3	1	1	0.90	1.00	0.80	**0.72**	45.00	32.40
10	10	1	3	5	3	3	2	2	0.80	1.00	0.80	**0.64**	30.00	19.20
11	28	1	3	6	3	4	2	2	0.80	1.00	0.80	**0.64**	20.00	12.80
12	18	1	3	7	3	4	3	3	0.70	1.00	0.80	**0.56**	10.00	5.60
13	6	1	3	8	3	4	4	4	0.60	1.00	0.80	**0.48**	5.00	2.40
14	41	1	3	9	3	4	5	5	0.50	1.00	0.80	**0.40**	3.00	1.20
15	16	1	3	10	3	6	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48
16	33	1	4	0	4	0	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
17	9	1	4	1	4	0	1	1	0.90	1.00	0.80	**0.72**	45.00	32.40
18	43	1	4	2	4	1	1	1	0.90	1.00	0.80	**0.72**	40.00	28.80
19	13	1	4	3	4	3	0	0	1.00	1.00	1.00	**1.00**	35.00	35.00
20	27	1	4	4	4	3	1	1	0.90	1.00	0.80	**0.72**	25.00	18.00
21	7	1	4	5	4	4	1	1	0.90	1.00	0.80	**0.72**	10.00	7.20
22	26	1	4	6	4	4	2	2	0.80	1.00	0.80	**0.64**	3.00	1.92
23	30	1	4	7	4	3	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48
24	8	1	4	8	4	7	1	1	0.90	1.00	0.80	**0.72**	0.00	0.00
25	35	1	4	9	4	6	3	3	0.70	1.00	0.80	**0.56**	0.00	0.00
26	36	1	4	10	4	9	1	1	0.90	1.00	0.80	**0.72**	0.00	0.00
27	25	2	3	0	3	1	1	-1	0.90	1.00	0.30	**0.27**	90.00	24.30
28	3	2	3	1	3	2	1	-1	0.90	1.00	0.30	**0.27**	90.00	24.30
29	20	2	3	2	3	2	0	0	1.00	1.00	1.00	**1.00**	75.00	75.00
30	39	2	3	3	3	3	0	0	1.00	1.00	1.00	**1.00**	55.00	55.00
31	1	2	3	4	3	4	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
32	15	2	3	5	3	3	2	2	0.80	1.00	0.80	**0.64**	30.00	19.20
33	22	2	3	6	3	4	2	2	0.80	1.00	0.80	**0.64**	20.00	12.80
34	38	2	3	7	3	4	3	3	0.70	1.00	0.80	**0.56**	10.00	5.60
35	17	2	3	8	3	6	2	2	0.80	1.00	0.80	**0.64**	5.00	3.20
36	4	2	3	9	3	5	4	4	0.60	1.00	0.80	**0.48**	3.00	1.44
37	44	2	3	10	3	6	4	4	0.60	1.00	0.80	**0.48**	1.00	0.48
38	14	2	4	0	4	0	0	0	1.00	1.00	1.00	**1.00**	45.00	45.00
39	11	2	4	1	3	1	0	0	1.00	0.75	1.00	**0.75**	45.00	33.75
40	2	2	4	2	4	3	1	-1	0.90	1.00	0.30	**0.27**	40.00	10.80
41	34	2	4	3	4	2	1	1	0.90	1.00	0.80	**0.72**	35.00	25.20
42	32	2	4	4	4	5	1	-1	0.90	1.00	0.30	**0.27**	25.00	6.75
43	24	2	4	5	4	5	0	0	1.00	1.00	1.00	**1.00**	10.00	10.00
44	5	2	4	6	4	6	0	0	1.00	1.00	1.00	**1.00**	3.00	3.00
45	19	2	4	7	4	7	0	0	1.00	1.00	1.00	**1.00**	1.00	1.00
46	12	2	4	8	4	9	1	-1	0.90	1.00	0.30	**0.27**	0.00	0.00
47	42	2	4	9	4	7	2	2	0.80	1.00	0.80	**0.64**	0.00	0.00
48	21	2	4	10	4	8	2	2	0.80	1.00	0.80	**0.64**	0.00	0.00

	A	B	C	D	E	F	G
1							
2	SUM: POSITION/ LEVEL 0/ DAY/ VOLVO						
3							
4	S/M	ALN	ADIS		AVERAGE		AV/LN
5	1	3	0		0.36		0.27
6	1	3	1		0.37		0.35
7	1	3	2		0.38		0.55
8	1	3	3		0.54		0.49
9	1	3	4		0.61		0.53
10	1	3	5		0.65		0.65
11	1	3	6		0.69		0.51
12	1	3	7		0.59		0.51
13	1	3	8		0.67		0.67
14	1	3	9		0.56		0.57
15	1	3	10		0.55		0.68
16	1	4	0		0.17		
17	1	4	1		0.32		
18	1	4	2		0.71		
19	1	4	3		0.44		
20	1	4	4		0.44		
21	1	4	5		0.65		
22	1	4	6		0.32		
23	1	4	7		0.42		
24	1	4	8		0.66		
25	1	4	9		0.58		
26	1	4	10		0.81		
27	2	3	0		0.22		0.20
28	2	3	1		0.37		0.33
29	2	3	2		0.63		0.54
30	2	3	3		0.54		0.56
31	2	3	4		0.77		0.54
32	2	3	5		0.59		0.48
33	2	3	6		0.83		0.66
34	2	3	7		0.76		0.56
35	2	3	8		0.73		0.55
36	2	3	9		0.56		0.45
37	2	3	10		0.59		0.67
38	2	4	0		0.17		
39	2	4	1		0.29		
40	2	4	2		0.45		
41	2	4	3		0.57		
42	2	4	4		0.30		
43	2	4	5		0.36		
44	2	4	6		0.49		
45	2	4	7		0.36		
46	2	4	8		0.37		
47	2	4	9		0.33		
48	2	4	10		0.74		

FIGURE 4.16 SUMMARY OF POSITION PERFORMANCE FOR SIX SUBJECTS

FIGURE 4.17 SAMPLE OF NIGHT POSITION RESPONSE RECORDING FORM

RESPONSE SCORE FORM

PRACTICE/ (ACTUAL) _____

SUBJECT NO. 1

(POSITION) MOTION _____

MIRROR: 40" C

CONDITION: NIGHT

SEQUENCE NO. 15 / ACT #2

DATE: _____

TIME: _____

TRIAL NO.	RESPONSE
1	6
2	3
3	2
4	5
5	6
6	4
7	8
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
18	
19	
20	
21	
22	
23	
24	
25	
26	
27	
28	
29	
30	
31	
32	
33	
34	
35	
36	
37	
38	
39	
40	4
41	7
42	0
43	5
44	

An example of a nighttime position performance spreadsheet, as used when entering data is shown in Figure 4.18. Subject and condition information is the same as the daytime information. Here, because lane position is not measured, actual lane (A LN) and response lane (R LN) are absent. Position error weights (POS W) are also excluded since they rely on lane position data. All other columns are calculated in the same manner as daytime position performance.

After all data are entered for a particular mirror and condition the data are sorted in ascending order, first on single/multiple target (column B) and second on the actual distance (column C). The result is shown in Figure 4.19. A spreadsheet with averages for all subjects for the condition presented (night, non-spherical curved (V) mirror) is shown in Figure 4.20. Here, averages for distances 0 - 10 for both single and multiple targets are given.

4.6.6.5 Performance Summary

The spreadsheet shown in Figure 4.21 illustrates the performance summary for the non-spherical curved (V) mirror, right side, day, single target vehicle, level 0 training. It combines position performance scores (column B) with motion performance scores (column C).

Position scores reflect averages for both lanes and all distances 0-10. Motion performance scores of Figure 4.21 reflect averages for both lanes and starting motion distances of three, six or nine car lengths back. Column D contains the maximum possible score or importance weights. Column E is the total weighted score which equals the position score, column B, the motion score, column C, and the importance weight, column D, multiplied by one another. This score is then cumulated over distances 0 - 10, as reflected in column F. Column G is the cumulated maximum possible score as taken from column D. Column H is column F divided by column G multiplied by 100. It equals the percentage of the maximum possible cumulative score. These values are then plotted for various conditions.

FIGURE 4.18 SAMPLE NIGHT POSITION PERFORMANCE DATA SPREADSHEET

	A	B	C	D	E	F	G	H	I	J	K
1	SUB:	MIR:	COND:	TRAY:	SEQ:						
2	1	1	2	2	15						
3											
4	TRL	S/M	ADIS	RDIS	ABS. D	SIN D	MAGN.	DIR W	WTS S	MAX S	OBT S
5	1	2	4	6	2	-2	0.80	0.30	**0.24**	35.00	8.40
6	2	2	2	3	1	-1	0.90	0.30	**0.27**	57.50	15.53
7	3	2	0	2	2	-2	0.80	0.30	**0.24**	67.50	16.20
8	4	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
9	5	2	6	6	0	0	1.00	1.00	**1.00**	11.50	11.50
10	6	1	8	4	4	4	0.60	0.80	**0.48**	2.50	1.20
11	7	1	5	8	3	-3	0.70	0.30	**0.21**	20.00	4.20
12	8	1	8	7	1	1	0.90	0.80	**0.72**	2.50	1.80
13	9	1	1	55	54	-54	0.10	0.30	**0.00**	67.50	0.00
14	10	1	5	2	3	3	0.70	0.80	**0.56**	20.00	11.20
15	11	2	1	1	0	0	1.00	1.00	**1.00**	67.50	67.50
16	12	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
17	13	1	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
18	14	2	0	2	2	-2	0.80	0.30	**0.24**	67.50	16.20
19	15	2	4	3	1	1	0.90	0.80	**0.72**	35.00	25.20
20	16	1	10	6	4	4	0.60	0.80	**0.48**	0.50	0.24
21	17	2	6	5	1	1	0.90	0.80	**0.72**	11.50	8.28
22	18	1	7	3	4	4	0.60	0.80	**0.48**	5.50	2.64
23	19	2	7	4	3	3	0.70	0.80	**0.56**	5.50	3.08
24	20	2	2	1	1	1	0.90	0.80	**0.72**	57.50	41.40
25	21	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
26	22	2	6	5	1	1	0.90	0.80	**0.72**	11.50	8.28
27	23	1	2	2	0	0	1.00	1.00	**1.00**	57.50	57.50
28	24	2	5	6	1	-1	0.90	0.30	**0.27**	20.00	5.40
29	25	2	0	1	1	-1	0.90	0.30	**0.27**	67.50	18.23
30	26	1	6	7	1	-1	0.90	0.30	**0.27**	11.50	3.11
31	27	1	4	10	6	-6	0.40	0.30	**0.12**	35.00	4.20
32	28	1	6	3	3	3	0.70	0.80	**0.56**	11.50	6.44
33	29	1	0	55	55	-55	0.10	0.30	**0.00**	67.50	0.00
34	30	1	7	8	1	-1	0.90	0.30	**0.27**	5.50	1.49
35	31	1	3	2	1	1	0.90	0.80	**0.72**	45.00	32.40
36	32	2	4	4	0	0	1.00	1.00	**1.00**	35.00	35.00
37	33	1	0	0	0	0	1.00	1.00	**1.00**	67.50	67.50
38	34	2	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
39	35	1	9	6	3	3	0.70	0.80	**0.56**	1.75	0.98
40	36	1	10	6	4	4	0.60	0.80	**0.48**	0.50	0.24
41	37	1	1	1	0	0	1.00	1.00	**1.00**	67.50	67.50
42	38	2	6	7	1	-1	0.90	0.30	**0.27**	11.50	3.11
43	39	2	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
44	40	1	4	2	2	2	0.80	0.80	**0.64**	35.00	22.40
45	41	1	9	4	5	5	0.50	0.80	**0.40**	1.75	0.70
46	42	2	8	7	1	1	0.90	0.80	**0.72**	2.50	1.80
47	43	1	2	0	2	2	0.80	0.80	**0.64**	57.50	36.80
48	44	2	10	5	5	5	0.50	0.80	**0.40**	0.50	0.20

FIGURE 4.19 SAMPLE NIGHT POSITION PERFORMANCE DATA SPREADSHEET SORTED BY TARGET AND DISTANCE

	A	B	C	D	E	F	G	H	I	J	K
1	SUB:	MIR:	COND:	TRAY:	SEQ:						
2	1	1	2	2	15						
3											
4	TRL	S/M	ADIS	RDIS	ABS. D	SIN D	MAGN.	DIR W	WTS S	MAX S	OBT S
5	29	1	0	55	55	-55	0.10	0.30	**0.00**	67.50	0.00
6	33	1	0	0	0	0	1.00	1.00	**1.00**	67.50	67.50
7	9	1	1	55	54	-54	0.10	0.30	**0.00**	67.50	0.00
8	37	1	1	1	0	0	1.00	1.00	**1.00**	67.50	67.50
9	23	1	2	2	0	0	1.00	1.00	**1.00**	57.50	57.50
10	43	1	2	0	2	2	0.80	0.80	**0.64**	57.50	36.80
11	13	1	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
12	31	1	3	2	1	1	0.90	0.80	**0.72**	45.00	32.40
13	27	1	4	10	6	-6	0.40	0.30	**0.12**	35.00	4.20
14	40	1	4	2	2	2	0.80	0.80	**0.64**	35.00	22.40
15	7	1	5	8	3	-3	0.70	0.30	**0.21**	20.00	4.20
16	10	1	5	2	3	3	0.70	0.80	**0.56**	20.00	11.20
17	26	1	6	7	1	-1	0.90	0.30	**0.27**	11.50	3.11
18	28	1	6	3	3	3	0.70	0.80	**0.56**	11.50	6.44
19	18	1	7	3	4	4	0.60	0.80	**0.48**	5.50	2.64
20	30	1	7	8	1	-1	0.90	0.30	**0.27**	5.50	1.49
21	6	1	8	4	4	4	0.60	0.80	**0.48**	2.50	1.20
22	8	1	8	7	1	1	0.90	0.80	**0.72**	2.50	1.80
23	35	1	9	6	3	3	0.70	0.80	**0.56**	1.75	0.98
24	41	1	9	4	5	5	0.50	0.80	**0.40**	1.75	0.70
25	16	1	10	6	4	4	0.60	0.80	**0.48**	0.50	0.24
26	36	1	10	6	4	4	0.60	0.80	**0.48**	0.50	0.24
27	3	2	0	2	2	-2	0.80	0.30	**0.24**	67.50	16.20
28	14	2	0	2	2	-2	0.80	0.30	**0.24**	67.50	16.20
29	25	2	0	1	1	-1	0.90	0.30	**0.27**	67.50	18.23
30	11	2	1	1	0	0	1.00	1.00	**1.00**	67.50	67.50
31	2	2	2	3	1	-1	0.90	0.30	**0.27**	57.50	15.53
32	20	2	2	1	1	1	0.90	0.80	**0.72**	57.50	41.40
33	34	2	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
34	39	2	3	3	0	0	1.00	1.00	**1.00**	45.00	45.00
35	1	2	4	6	2	-2	0.80	0.30	**0.24**	35.00	8.40
36	15	2	4	3	1	1	0.90	0.80	**0.72**	35.00	25.20
37	32	2	4	4	0	0	1.00	1.00	**1.00**	35.00	35.00
38	24	2	5	6	1	-1	0.90	0.30	**0.27**	20.00	5.40
39	5	2	6	6	0	0	1.00	1.00	**1.00**	11.50	11.50
40	17	2	6	5	1	1	0.90	0.80	**0.72**	11.50	8.28
41	22	2	6	5	1	1	0.90	0.80	**0.72**	11.50	8.28
42	38	2	6	7	1	-1	0.90	0.30	**0.27**	11.50	3.11
43	19	2	7	4	3	3	0.70	0.80	**0.56**	5.50	3.08
44	4	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
45	12	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
46	21	2	8	5	3	3	0.70	0.80	**0.56**	2.50	1.40
47	42	2	8	7	1	1	0.90	0.80	**0.72**	2.50	1.80
48	44	2	10	5	5	5	0.50	0.80	**0.40**	0.50	0.20

FIGURE 4.20 SAMPLE NIGHT POSITION PERFORMANCE SPREADSHEET
AVERAGE FOR ALL SUBJECTS

	A	B	C	D	E	F	G
1							
2	SUM: POSITION/ LEVEL 0/ NIGHT/						
3							
4	S/M	ADIS		AVERAGE			AVE/DIS
5	1	0		0.21			
6	1	0		0.38		0	0.30
7	1	1		0.24			
8	1	1		0.63		1	0.44
9	1	2		0.63			
10	1	2		0.54		2	0.59
11	1	3		0.69			
12	1	3		0.59		3	0.64
13	1	4		0.55			
14	1	4		0.52		4	0.54
15	1	5		0.47			
16	1	5		0.60		5	0.54
17	1	6		0.47			
18	1	6		0.52		6	0.50
19	1	7		0.52			
20	1	7		0.47		7	0.50
21	1	8		0.61			
22	1	8		0.55		8	0.58
23	1	9		0.42			
24	1	9		0.55		9	0.49
25	1	10		0.44			
26	1	10		0.53		10	0.49
27	2	0		0.38			
28	2	0		0.38			
29	2	0		0.39		0	0.38
30	2	1		0.83		1	0.83
31	2	2		0.58			
32	2	2		0.57		2	0.58
33	2	3		0.65			
34	2	3		0.83		3	0.74
35	2	4		0.55			
36	2	4		0.53			
37	2	4		0.74		4	0.61
38	2	5		0.53		5	0.53
39	2	6		0.88			
40	2	6		0.82			
41	2	6		0.63			
42	2	6		0.44		6	0.69
43	2	7		0.68		7	0.68
44	2	8		0.72			
45	2	8		0.62			
46	2	8		0.72			
47	2	8		0.67		8	0.68
48	2	10		0.61		10	0.61

FIGURE 4.21 SAMPLE OF PERFORMANCE SUMMARY

	A	B	C	D	E	F	G	H
1	**MIRROR:**							
2	**CONDITION:**	DAY						
3	**SIDE:**	RIGHT						
4	**LEVEL (TR):**	0						
5	**SING/MULT:**	SINGLE						
6								
7								
8	LANE/DIST	POSITION	MOTION	IMPORT.	TOT. WTD.	CUMUL.	MAX. POSS.	% MAX.
9		SCORE	SCORE	WEIGHT	SCORE	SCORE	CUM SCORE	POSS.SCORE
10								
11	ADJACENT							
12	0	0.36	0.65	90.00	21.06	121.63	424.00	28.69
13	1	0.37	0.65	90.00	21.65	100.57	334.00	30.11
14	2	0.38	0.65	75.00	18.53	78.92	244.00	32.34
15	3	0.54	0.65	55.00	19.31	60.39	169.00	35.73
16	4	0.61	0.65	45.00	17.84	41.08	114.00	36.04
17	5	0.65	0.52	30.00	10.14	23.24	69.00	33.68
18	6	0.69	0.52	20.00	7.18	13.10	39.00	33.59
19	7	0.59	0.52	10.00	3.07	5.92	19.00	31.16
20	8	0.67	0.51	5.00	1.71	2.85	9.00	31.67
21	9	0.56	0.51	3.00	0.86	1.14	4.00	28.50
22	10	0.55	0.51	1.00	0.28	0.28	1.00	28.00
23	TOTAL			424.00				
24								
25	FAR							
26	0	0.17	0.76	45.00	5.81	63.75	204.00	31.25
27	1	0.32	0.76	45.00	10.94	57.94	159.00	36.44
28	2	0.71	0.76	40.00	21.58	47.00	114.00	41.23
29	3	0.44	0.76	35.00	11.70	25.42	74.00	34.35
30	4	0.44	0.76	25.00	8.36	13.72	39.00	35.18
31	5	0.65	0.68	10.00	4.42	5.36	14.00	38.29
32	6	0.32	0.68	3.00	0.65	0.94	4.00	23.50
33	7	0.42	0.68	1.00	0.29	0.29	1.00	29.00
34	TOTAL			204.00				
35								
36	COMBINED							
37	0			135.00	26.87	185.38	628.00	29.52
38	1			135.00	32.59	158.51	493.00	32.15
39	2			115.00	40.11	125.92	358.00	35.17
40	3			90.00	31.01	85.81	243.00	35.31
41	4			70.00	26.20	54.80	153.00	35.82
42	5			40.00	14.56	28.60	83.00	34.46
43	6			23.00	7.83	14.04	43.00	32.65
44	7			11.00	3.36	6.21	20.00	31.05
45	8			5.00	1.71	2.85	9.00	31.67
46	9			3.00	0.86	1.14	4.00	28.50
47	10			1.00	0.28	0.28	1.00	28.00
48	TOTAL			628.00				

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Chapter 4.0, in conjunction with various referenced appendices, presented the detailed description of the simulated-use rear vision device test protocol. Issues concerning, its validity and reliability are discussed below.

5.1.1 Validity

The ultimate test of the validity of the simulated-use method is the correlation of mirror FOM scores with actual accident rates for those rear vision systems. Such an undertaking, however, is likely not to be feasible in the near or even far term. Thus, the following addresses the validity issue using limited existing data.

5.1.1.1 Correlation of Looking Behavior Measures

An attempt was made to correlate the "number of looks" measures obtained from the simulated-use method with measures of looking behavior obtained by Burger et.al., 1980(b), in actual driving situations. The simulated-use method resulted in a small increase in the number of looks (about 5%) for the 40 inch convex mirror relative to the plane mirror.

Unfortunately, the actual driving looking behavior measures for plane and 40 inch convex mirrors on the same side of vehicles (van and truck) are confounded with either inside mirror looks and/or direct looks to the rear-- behavior not possible in the simulated-use tests. Due to such confounding, comparison between looking behavior obtained in the 1980 study with simulated-use measures is unwarranted.

5.1.2 Reliability of Simulated-Use Measures

Test reliability is a measure of the consistency of performance measures from test session to test session. Data from development test sessions II and III of Chapter 3.0 permit assessment of test-retest reliability of the simulated-use test protocol. Test sessions II and III included the non-spherical (V) mirror mounted in the right door position. Daylight and night single target vehicle stimuli were used in both sessions. Session II used 4 different subjects from the 6 subjects employed in Session III. A reliable test method would result in highly similar overall Figure of Merit (FOM) scores for these same test conditions. Table 5.1 below shows the percent of maximum FOM score obtained using the non-spherical (V) mirror, day and night, for Sessions II and III.

TABLE 5.1. NON-SPHERICAL (V) MIRROR FOM PERCENT SCORE

	DAY	NIGHT
SESSION II	41.4	35.1
SESSION III	39.6	34.7
DIFFERENCE (%)	4.4	1.1

The data clearly indicate excellent test score reliability considering the two sessions used only 4 and 6 subjects, respectively.

5.1.3 Current Method Limitations

Performance scores and FOM scores for mirrors which are obtained using the simulated-use test protocol have one limitation in its current form. FOM scores, it is maintained, provide a valid and reliable measure for comparing rear vision systems relative to one another and absolutely to a standard such as a plane left door mount device. The FOM measures are, however, at this time only a valid measure for applications where the device is the only source of rear/side information. No measure has been made regarding whether any or all devices are superior or inferior to direct vision. That is, there has been no assessment of whether performance observed is "better" or "worse" than not using the mirror at all, e.g., gaining information via directly looking to the rear (if possible). This issue is further discussed in the recommendations section.

5.2 Recommendations

5.2.1 Integrating Direct and Indirect Vision

As noted above, the simulated-use test method evaluates rear vision devices assuming that they are the only source of rear/side information. This is true of many vehicles including enclosed van's, campers and most larger trucks. For vehicles permitting direct visual access to side and to a lessor extent further rearward information, direct visibility viewing theoretically might be better than rear vision device viewing. That is, a vision device may possibly perform so poorly that turning to look to the rear is "better" than using the device--even considering the potential of increased forward collision.

To date no research has adequately addressed the integration of direct and indirect viewing of other roadway vehicles. This is likely due to the apparent complexity of sorting out driver behavior and its consequences on crash involvement probabilities. Conceivably an experiment could be designed and conducted to determine the limits of direct and indirect viewing. One might be able to establish a primary direct

vision area, say ± 40 degrees horizontally, to arbitrarily select a value, about the driver's line of sight. This would define the area not to be viewed by rear vision devices, but to be viewed directly. Also, rear vision system displays would be located within this envelope. The remaining area would be defined as the desired rear vision device field of view. The simulated-use test method could then measure the effectiveness of a device in providing information over this defined field. The field might include, for example, adjacent lane distances of 2-10 car lengths and far lane distances of 4-10 car lengths. It is recommended that the feasibility of such a study be undertaken.

5.2.2 Simulated-Use Data Management and Analysis

Due to the large number of performance measures (3 position and 2 motion) and conditions (adjacent and far lane, day and night, single and multiple targets, rain and dry, subject characteristics and practice levels of 0, 1 and 2) and the requirement to weight and combine measures into an overall FOM score, data handling is cumbersome and time consuming at present. If large numbers of devices and or subjects are to be tested in the future, additional software development is warranted to simplify management and analysis phases of the testing protocol.

5.2.3 Facility Enhancement

The developmental nature of the program dictated a facility which was totally flexible since its modifications were ongoing. As a result, a rather primitive facility was developed. If any significant amount of future testing is to be conducted the facility should be upgraded with respect to appearance, environmental control and equipment.

5.2.4 Review of Performance Measure Weights

There are two sets of subjective weights which should be reviewed. First, weights were developed, by concensus of the project staff, for application to individual performance measures, eg number of looks. While they were derived with considerable expertise and caution they should be reviewed by an independent group to confirm or modify their values. Second, importance weights, i.e., those assigned to the lane and distances at which performance was measured, should be reviewed. These weights were based upon two formal subjective judgement studies and are likely quite satisfactory. An alternative to these might be empirically devised accident probabilities for lane changing in the context of target vehicles in various positions. Also, weights should be determined for night, day, and rain exposure so that day/night/FOM scores can be combined.

5.2.5 Validation of the Method

As noted the ultimate credibility of the simulated-use test method is dependent upon the correlation between its results and actual accident experience. Since such a validation is unlikely, especially on a large scale, some intermediate criterion should be selected for subsequent validation. The costs and limitations of on-the-road experiments is well known. Lower cost, less risky field studies, on the other hand, are generally less agreeable to those seeking greater confidence in validity.

6.0 REFERENCES

1. Burger, W.J., Mulholland, M.U., Smith R.L. and Sharkey, T.J. Passenger Vehicle, Light Truck and Van Convex Mirror Optimization Studies; Volume 1; Convex Mirror Optimization, Vector Enterprises, Inc., Santa Monica, CA, August 1980 (a).

2. Burger, W.J., Mulholland, M.U., Smith, R.L., Sharkey, T.J. and Bardales. Passenger Vehicle, Light Truck and Van Convex Mirror Optimization Studies; Volume 2; Evaluation of Alternative Mirror Configurations, Vector Enterprises, Inc., Santa Monica, CA, December 1980 (b).

3. Henderson, R.L., Smith, R.L., Burger, W.J. and Stern, S.D. Visibility from Motor Vehicles, SAE International Congress and Exposition, Detroit, MI, February 28 - March 4, 1983.

4. Smith, R.L., Bardales, M.C. and Burger, W.J. Perceived Importance of Zones Surrounding a Vehicle and Learning to Use a Convex Mirror Effectively, Vector Enterprises, Inc., Santa Monica, CA, September 1978.

APPENDICIES

A. Preparation of Target Vehicle Stimulus Slides

B. Performance Summary (Session I)

C. Performance Summary (Session II)

D. Performance Summary (Session III)

E. Stimulus Slide Presentation Information: Motion/Day-Night

F. Stimulus Slide Presentation Information: Position/Day

G. Stimulus Slide Presentation Information: Position/Night

H. Rain Simulation

I. Simulated-Use Apparatus Set-Up

J. Computer Program

K. Subject Instructions

APPENDIX A
PREPARATION OF TARGET VEHICLE STIMULUS SLIDES

Overview

Target vehicle stimulus slides for simulated-use tests were prepared using 1/25 scale models of vehicles and a roadway scene extending 5 lanes (12 foot each) horizontally and 185 feet (in scale) longitudinally. Single target vehicle and multiple (4) target vehicle slides were prepared in day and night environments for each of two mirror mounting locations--left and right door mount. Single target vehicle daylight stimuli were prepared for the center inside mount location. Target vehicles were photographed at 1/2 car length intervals in each lane visible to the observer via a mirror starting at zero car lengths (i.e., front bumper adjacent to observer vehicle door, see Figure A-1) to 14 car lengths. A car length is defined as 13 feet.

Method

Model Board

A 4 foot x 11 foot 1/25 scale model of a highway scene was constructed of plywood and painted medium gray (Krylon gray primer). Lane lines were constructed using 1/4 inch white tape. The model board was surrounded by a light blue fabric curtain to simulate a sky background (see Figures A-2 and A-3).

Target Vehicles

Target vehicles were 1/25 scale plastic models available in local hobby stores. Daylight target vehicles were yellow, red, white and blue while night target vehicles were painted black and fitted with low voltage lamps to simulate headlights.

Photography

A Nikon Nikkormat camera with 28 mm focal length TAM wide angle lens was used for all photographs. Daylight photographs were made at F16 using a 1 second exposure while for night photographs an F of 5.6 and an exposure of 1 second was used. Eastman 5294 color negative film (ASA400) was used for all photographs. The film negative was processed and numerous slide duplicates obtained to serve as stimulus slides.

The camera was adjusted vertically and horizontally to proper 1/25 scale for each mirror position (left, center and right) and aligned to view the rear scene viewed by a mirror in a given location. For left and right mirror positions the inside edge of the camera FOV was aligned with the observer's vehicle body edge while the FOV was centered about the vehicle centerline for the center mirror FOV photographs.

The target vehicle (and other vehicles) were moved in a pre-arranged pattern on the model board and photos taken. A total of 32 slides were made for each lane visible, one for each 1/2 car length from 0 to 14 car lengths for day and night.

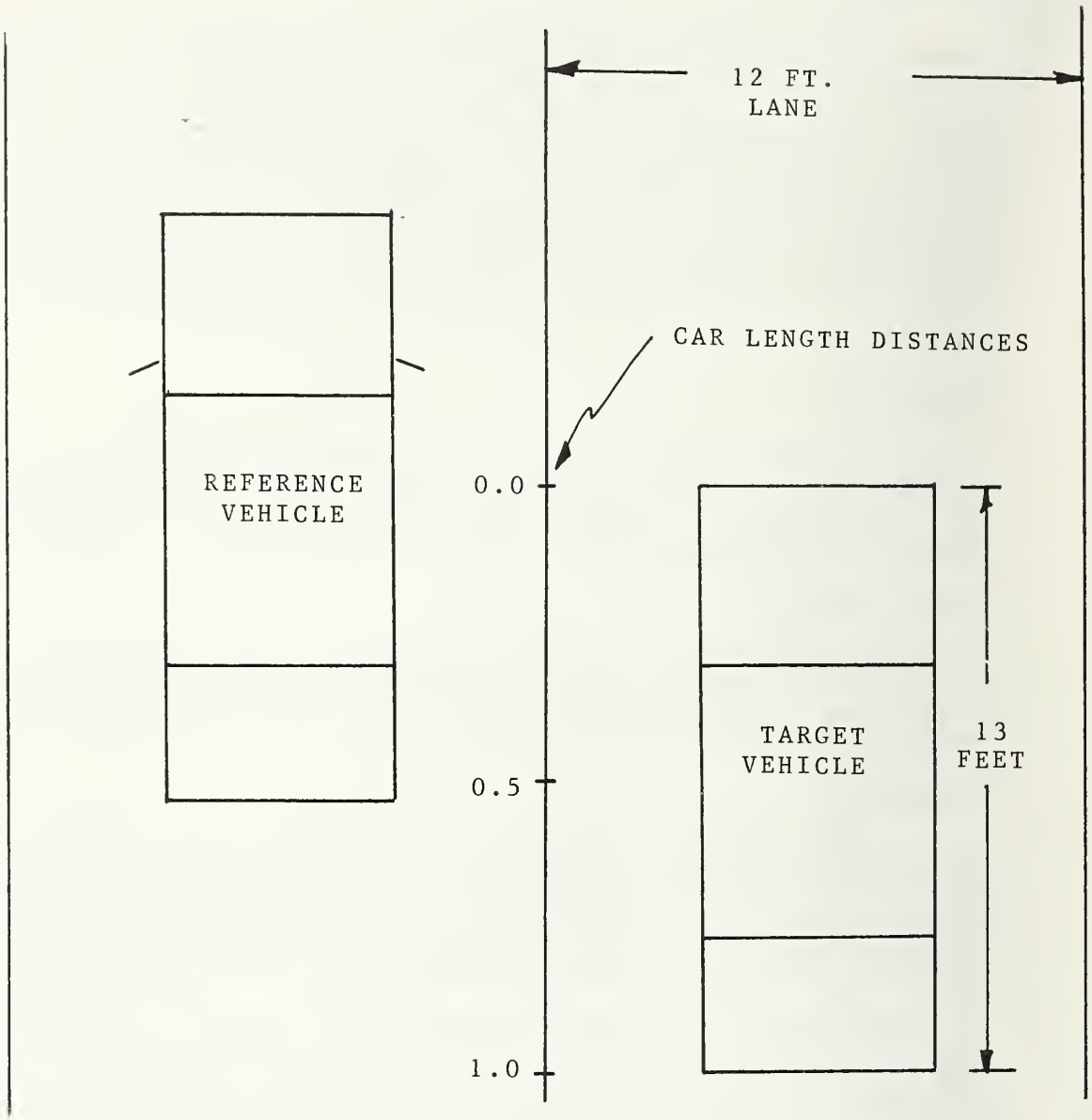


FIGURE A -1 GRAPHIC DEFINITION OF CAR LENGTH DISTANCE

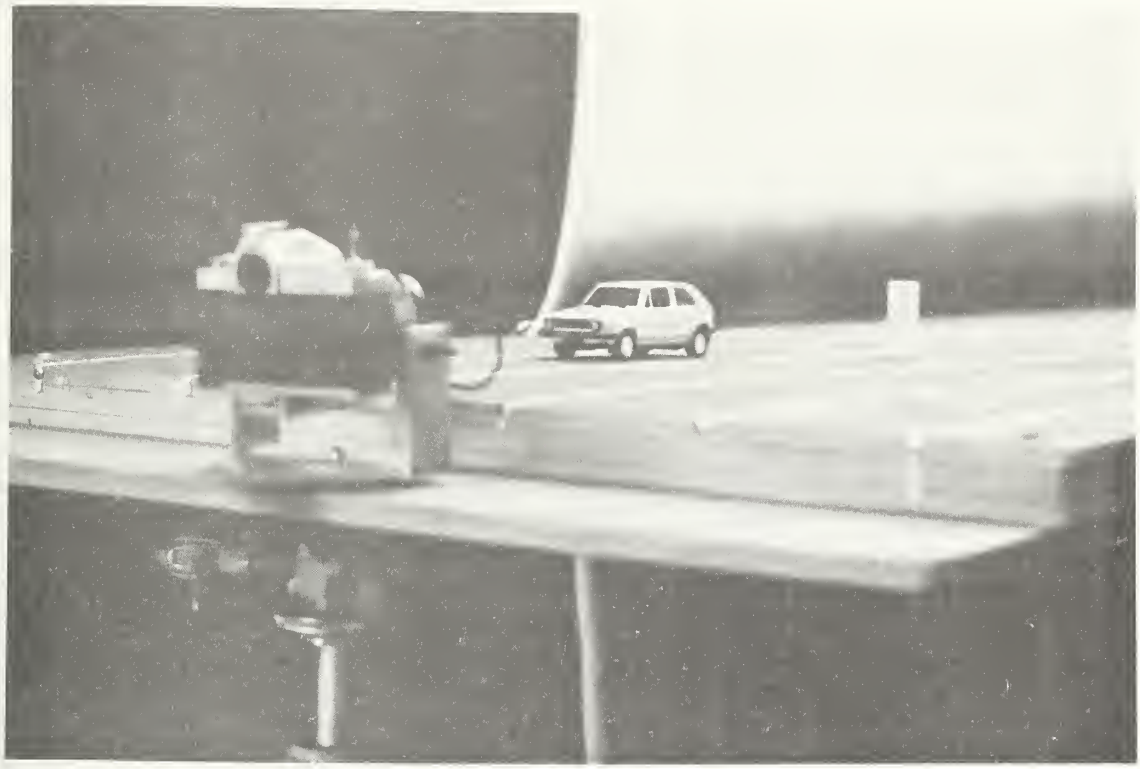


FIGURE A-2 MODEL BOARD LAYOUT (GROUND VIEW)

FIGURE A-3 MODEL BOARD LAYOUT (TOP VIEW)

Appendix B. Performance Summary (Session I)

MIRROR: PLANE
CONDITION: DAY
SIDE: LEFT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.82	90.00	0.00	173.41	424.00	40.90
1	0.59	0.82	90.00	43.54	173.41	334.00	51.92
2	0.67	0.82	75.00	41.21	129.86	244.00	53.22
3	0.65	0.82	55.00	29.32	88.66	169.00	52.46
4	0.65	0.82	45.00	23.99	59.34	114.00	52.06
5	0.65	0.82	30.00	15.99	35.36	69.00	51.24
6	0.70	0.72	20.00	10.08	19.37	39.00	49.66
7	0.69	0.72	10.00	4.97	9.29	19.00	48.88
8	0.65	0.72	5.00	2.34	4.32	9.00	48.00
9	0.67	0.72	3.00	1.45	1.98	4.00	49.50
10	0.74	0.72	1.00	0.53	0.53	1.00	53.28
TOTAL			424.00				
FAR							
0	0.00	0.78	45.00	0.00	10.62	204.00	5.20
1	0.00	0.78	45.00	0.00	10.62	159.00	6.68
2	0.00	0.78	40.00	0.00	10.62	114.00	9.31
3	0.05	0.78	35.00	1.37	10.62	74.00	14.35
4	0.13	0.78	25.00	2.54	9.25	39.00	23.72
5	0.59	0.78	10.00	4.60	6.72	14.00	47.97
6	0.70	0.78	3.00	1.64	2.11	4.00	52.85
7	0.61	0.78	1.00	0.48	0.48	1.00	47.58
TOTAL			204.00				
COMBINED							
0			135.00	0.00	184.02	628.00	29.30
1			135.00	43.54	184.02	493.00	37.33
2			115.00	41.21	140.48	358.00	39.24
3			90.00	30.68	99.27	243.00	40.85
4			70.00	26.52	68.59	153.00	44.83
5			40.00	20.59	42.07	83.00	50.69
6			23.00	11.72	21.48	43.00	49.96
7			11.00	5.44	9.76	20.00	48.82
8			5.00	2.34	4.32	9.00	48.00
9			3.00	1.45	1.98	4.00	49.50
10			1.00	0.53	0.53	1.00	53.28
TOTAL			628.00				

MIRROR: 40 "
CONDITION: DAY
SIDE: LEFT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.60	0.80	90.00	43.20	214.56	424.00	50.60
1	0.66	0.80	90.00	47.52	171.36	334.00	51.31
2	0.68	0.80	75.00	40.80	123.84	244.00	50.75
3	0.60	0.80	55.00	26.40	83.04	169.00	49.14
4	0.63	0.80	45.00	22.68	56.64	114.00	49.68
5	0.61	0.80	30.00	14.64	33.96	69.00	49.22
6	0.73	0.69	20.00	10.07	19.32	39.00	49.54
7	0.71	0.69	10.00	4.90	9.25	19.00	48.66
8	0.73	0.69	5.00	2.52	4.35	9.00	48.30
9	0.63	0.69	3.00	1.30	1.83	4.00	45.71
10	0.76	0.69	1.00	0.52	0.52	1.00	52.44
TOTAL			424.00				
FAR							
0	0.00	0.74	45.00	0.00	62.20	204.00	30.49
1	0.08	0.74	45.00	2.66	62.20	159.00	39.12
2	0.63	0.74	40.00	18.65	59.53	114.00	52.22
3	0.84	0.74	35.00	21.76	40.89	74.00	55.25
4	0.65	0.74	25.00	12.03	19.13	39.00	49.05
5	0.65	0.74	10.00	4.81	7.10	14.00	50.74
6	0.80	0.74	3.00	1.78	2.29	4.00	57.35
7	0.70	0.74	1.00	0.52	0.52	1.00	51.80
TOTAL			204.00				
COMBINED							
0			135.00	43.20	276.76	628.00	44.07
1			135.00	50.18	233.56	493.00	47.37
2			115.00	59.45	183.37	358.00	51.22
3			90.00	48.16	123.93	243.00	51.00
4			70.00	34.71	75.77	153.00	49.52
5			40.00	19.45	41.06	83.00	49.47
6			23.00	11.85	21.61	43.00	50.27
7			11.00	5.42	9.76	20.00	48.82
8			5.00	2.52	4.35	9.00	48.30
9			3.00	1.30	1.83	4.00	45.71
10			1.00	0.52	0.52	1.00	52.44
TOTAL			628.00				

MIRROR: NON-SPHERICAL (Y)
CONDITION: DAY
SIDE: LEFT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.71	0.77	90.00	49.20	255.15	424.00	60.18
1	0.88	0.77	90.00	60.98	205.95	334.00	61.66
2	0.83	0.77	75.00	47.93	144.97	244.00	59.41
3	0.86	0.77	55.00	36.42	97.03	169.00	57.42
4	0.72	0.77	45.00	24.95	60.61	114.00	53.17
5	0.82	0.77	30.00	18.94	35.67	69.00	51.69
6	0.66	0.70	20.00	9.24	16.72	39.00	42.88
7	0.53	0.70	10.00	3.71	7.48	19.00	39.38
8	0.58	0.70	5.00	2.03	3.77	9.00	41.92
9	0.62	0.70	3.00	1.30	1.74	4.00	43.58
10	0.63	0.70	1.00	0.44	0.44	1.00	44.10
TOTAL			424.00				
FAR							
0	0.08	0.67	45.00	2.41	78.41	204.00	38.44
1	0.71	0.67	45.00	21.41	76.00	159.00	47.80
2	0.80	0.67	40.00	21.44	54.59	114.00	47.89
3	0.73	0.67	35.00	17.12	33.15	74.00	44.80
4	0.60	0.67	25.00	10.05	16.03	39.00	41.11
5	0.64	0.67	10.00	4.29	5.98	14.00	42.74
6	0.61	0.67	3.00	1.23	1.70	4.00	42.38
7	0.70	0.67	1.00	0.47	0.47	1.00	46.90
TOTAL			204.00				
COMBINED							
0			135.00	51.62	333.56	628.00	53.12
1			135.00	82.39	281.95	493.00	57.19
2			115.00	69.37	199.56	358.00	55.74
3			90.00	53.54	130.19	243.00	53.57
4			70.00	35.00	76.65	153.00	50.10
5			40.00	23.23	41.65	83.00	50.18
6			23.00	10.47	18.42	43.00	42.83
7			11.00	4.18	7.95	20.00	39.76
8			5.00	2.03	3.77	9.00	41.92
9			3.00	1.30	1.74	4.00	43.58
10			1.00	0.44	0.44	1.00	44.10
TOTAL			628.00				

MIRROR: NON-SPHERICAL (Z)
CONDITION: DAY
SIDE: LEFT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.08	0.81	90.00	5.83	197.67	424.00	46.62
1	0.78	0.81	90.00	56.86	191.84	334.00	57.44
2	0.70	0.81	75.00	42.53	134.98	244.00	55.32
3	0.73	0.81	55.00	32.52	92.46	169.00	54.71
4	0.69	0.81	45.00	25.15	59.93	114.00	52.57
5	0.64	0.81	30.00	15.55	34.78	69.00	50.41
6	0.73	0.72	20.00	10.51	19.23	39.00	49.31
7	0.64	0.72	10.00	4.61	8.72	19.00	45.89
8	0.61	0.72	5.00	2.20	4.11	9.00	45.68
9	0.65	0.72	3.00	1.40	1.92	4.00	47.88
10	0.71	0.72	1.00	0.51	0.51	1.00	51.12
TOTAL			424.00				
FAR							
0	0.00	0.79	45.00	0.00	25.91	204.00	12.70
1	0.00	0.79	45.00	0.00	25.91	159.00	16.30
2	0.06	0.79	40.00	1.90	25.91	114.00	22.73
3	0.24	0.79	35.00	6.64	24.02	74.00	32.45
4	0.55	0.79	25.00	10.86	17.38	39.00	44.56
5	0.60	0.79	10.00	4.74	6.52	14.00	46.55
6	0.53	0.79	3.00	1.26	1.78	4.00	44.44
7	0.66	0.79	1.00	0.52	0.52	1.00	52.14
TOTAL			204.00				
COMBINED							
0			135.00	5.83	223.59	628.00	35.60
1			135.00	56.86	217.75	493.00	44.17
2			115.00	44.42	160.89	358.00	44.94
3			90.00	39.16	116.47	243.00	47.93
4			70.00	36.01	77.31	153.00	50.53
5			40.00	20.29	41.30	83.00	49.76
6			23.00	11.77	21.01	43.00	48.86
7			11.00	5.13	9.24	20.00	46.20
8			5.00	2.20	4.11	9.00	45.68
9			3.00	1.40	1.92	4.00	47.88
10			1.00	0.51	0.51	1.00	51.12
TOTAL			628.00				

Appendix C. Performance Summary (Session II)

MIRROR: PLANE
CONDITION: DAY
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.81	90.00	0.00	56.54	424.00	13.33
1	0.00	0.81	90.00	0.00	56.54	334.00	16.93
2	0.00	0.81	75.00	0.00	56.54	244.00	23.17
3	0.20	0.81	55.00	8.91	56.54	169.00	33.45
4	0.44	0.81	45.00	15.86	47.63	114.00	41.78
5	0.39	0.81	30.00	9.36	31.77	69.00	46.04
6	0.73	0.81	20.00	11.75	22.41	39.00	57.47
7	0.72	0.81	10.00	5.82	10.67	19.00	56.15
8	0.70	0.81	5.00	2.84	4.84	9.00	53.82
9	0.60	0.81	3.00	1.46	2.01	4.00	50.22
10	0.68	0.81	1.00	0.55	0.55	1.00	55.08
TOTAL			424.00				
FAR							
0	0.00	0.81	45.00	0.00	0.00	204.00	0.00
1	0.00	0.81	45.00	0.00	0.00	159.00	0.00
2	0.00	0.81	40.00	0.00	0.00	114.00	0.00
3	0.00	0.81	35.00	0.00	0.00	74.00	0.00
4	0.00	0.81	25.00	0.00	0.00	39.00	0.00
5	0.00	0.81	10.00	0.00	0.00	14.00	0.00
6	0.00	0.81	3.00	0.00	0.00	4.00	0.00
7	0.00	0.81	1.00	0.00	0.00	1.00	0.00
TOTAL			204.00				
COMBINED							
0			135.00	0.00	56.54	628.00	9.00
1			135.00	0.00	56.54	493.00	11.47
2			115.00	0.00	56.54	358.00	15.79
3			90.00	8.91	56.54	243.00	23.27
4			70.00	15.86	47.63	153.00	31.13
5			40.00	9.36	31.77	83.00	38.27
6			23.00	11.75	22.41	43.00	52.12
7			11.00	5.82	10.67	20.00	53.34
8			5.00	2.84	4.84	9.00	53.82
9			3.00	1.46	2.01	4.00	50.22
10			1.00	0.55	0.55	1.00	55.08
TOTAL			628.00				

MIRROR: PLANE
CONDITION: NIGHT
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.75	90.00	0.00	36.02	424.00	8.49
1	0.00	0.75	90.00	0.00	36.02	334.00	10.78
2	0.00	0.75	75.00	0.00	36.02	244.00	14.76
3	0.00	0.75	55.00	0.00	36.02	169.00	21.31
4	0.25	0.75	45.00	8.44	36.02	114.00	31.59
5	0.34	0.75	30.00	7.73	27.58	69.00	39.97
6	0.64	0.75	20.00	9.66	19.85	39.00	50.88
7	0.76	0.75	10.00	5.67	10.19	19.00	53.61
8	0.72	0.75	5.00	2.70	4.52	9.00	50.17
9	0.53	0.75	3.00	1.20	1.82	4.00	45.38
10	0.82	0.75	1.00	0.62	0.62	1.00	61.50
TOTAL			424.00				
FAR							
0	0.00	0.75	45.00	0.00	0.00	204.00	0.00
1	0.00	0.75	45.00	0.00	0.00	159.00	0.00
2	0.00	0.75	40.00	0.00	0.00	114.00	0.00
3	0.00	0.75	35.00	0.00	0.00	74.00	0.00
4	0.00	0.75	25.00	0.00	0.00	39.00	0.00
5	0.00	0.75	10.00	0.00	0.00	14.00	0.00
6	0.00	0.75	3.00	0.00	0.00	4.00	0.00
7	0.00	0.75	1.00	0.00	0.00	1.00	0.00
TOTAL			204.00				
COMBINED							
0			135.00	0.00	36.02	628.00	5.73
1			135.00	0.00	36.02	493.00	7.31
2			115.00	0.00	36.02	358.00	10.06
3			90.00	0.00	36.02	243.00	14.82
4			70.00	8.44	36.02	153.00	23.54
5			40.00	7.73	27.58	83.00	33.23
6			23.00	9.66	19.85	43.00	46.15
7			11.00	5.67	10.19	20.00	50.93
8			5.00	2.70	4.52	9.00	50.17
9			3.00	1.20	1.82	4.00	45.38
10			1.00	0.62	0.62	1.00	61.50
TOTAL			628.00				

MIRROR: PLANE
CONDITION: DAY RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.79	90.00	0.00	50.47	424.00	11.90
1	0.00	0.79	90.00	0.00	50.47	334.00	15.11
2	0.00	0.79	75.00	0.00	50.47	244.00	20.69
3	0.25	0.79	55.00	10.86	50.47	169.00	29.87
4	0.26	0.79	45.00	9.34	39.61	114.00	34.75
5	0.34	0.79	30.00	8.00	30.27	69.00	43.87
6	0.76	0.79	20.00	11.95	22.27	39.00	57.10
7	0.64	0.79	10.00	5.04	10.32	19.00	54.30
8	0.74	0.79	5.00	2.92	5.28	9.00	58.64
9	0.76	0.79	3.00	1.79	2.36	4.00	59.05
10	0.72	0.79	1.00	0.57	0.57	1.00	56.88
TOTAL			424.00				
FAR							
0	0.00	0.00	45.00	0.00	0.00	204.00	0.00
1	0.00	0.00	45.00	0.00	0.00	159.00	0.00
2	0.00	0.00	40.00	0.00	0.00	114.00	0.00
3	0.00	0.00	35.00	0.00	0.00	74.00	0.00
4	0.00	0.00	25.00	0.00	0.00	39.00	0.00
5	0.00	0.00	10.00	0.00	0.00	14.00	0.00
6	0.00	0.00	3.00	0.00	0.00	4.00	0.00
7	0.00	0.00	1.00	0.00	0.00	1.00	0.00
TOTAL			204.00				
COMBINED							
0			135.00	0.00	50.47	628.00	8.04
1			135.00	0.00	50.47	493.00	10.24
2			115.00	0.00	50.47	358.00	14.10
3			90.00	10.86	50.47	243.00	20.77
4			70.00	9.34	39.61	153.00	25.89
5			40.00	8.00	30.27	83.00	36.47
6			23.00	11.95	22.27	43.00	51.79
7			11.00	5.04	10.32	20.00	51.59
8			5.00	2.92	5.28	9.00	58.64
9			3.00	1.79	2.36	4.00	59.05
10			1.00	0.57	0.57	1.00	56.88
TOTAL			628.00				

MIRROR: PLANE
CONDITION: NIGHT RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.81	90.00	0.00	50.91	424.00	12.01
1	0.00	0.81	90.00	0.00	50.91	334.00	15.24
2	0.00	0.81	75.00	0.00	50.91	244.00	20.86
3	0.00	0.81	55.00	0.00	50.91	169.00	30.12
4	0.38	0.81	45.00	13.90	50.91	114.00	44.66
5	0.63	0.81	30.00	15.19	37.01	69.00	53.64
6	0.70	0.81	20.00	11.34	21.82	39.00	55.95
7	0.82	0.81	10.00	6.63	10.48	19.00	55.17
8	0.43	0.81	5.00	1.73	3.85	9.00	42.75
9	0.61	0.81	3.00	1.47	2.12	4.00	53.06
10	0.80	0.81	1.00	0.65	0.65	1.00	64.80
TOTAL			424.00				
FAR							
0	0.00	0.00	45.00	0.00	0.00	204.00	0.00
1	0.00	0.00	45.00	0.00	0.00	159.00	0.00
2	0.00	0.00	40.00	0.00	0.00	114.00	0.00
3	0.00	0.00	35.00	0.00	0.00	74.00	0.00
4	0.00	0.00	25.00	0.00	0.00	39.00	0.00
5	0.00	0.00	10.00	0.00	0.00	14.00	0.00
6	0.00	0.00	3.00	0.00	0.00	4.00	0.00
7	0.00	0.00	1.00	0.00	0.00	1.00	0.00
TOTAL			204.00				
COMBINED							
0			135.00	0.00	50.91	628.00	8.11
1			135.00	0.00	50.91	493.00	10.33
2			115.00	0.00	50.91	358.00	14.22
3			90.00	0.00	50.91	243.00	20.95
4			70.00	13.90	50.91	153.00	33.27
5			40.00	15.19	37.01	83.00	44.59
6			23.00	11.34	21.82	43.00	50.75
7			11.00	6.63	10.48	20.00	52.41
8			5.00	1.73	3.85	9.00	42.75
9			3.00	1.47	2.12	4.00	53.06
10			1.00	0.65	0.65	1.00	64.80
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.61	0.67	90.00	36.94	179.39	424.00	42.31
1	0.42	0.67	90.00	25.25	142.46	334.00	42.65
2	0.81	0.67	75.00	40.51	117.20	244.00	48.03
3	0.81	0.67	55.00	29.71	76.69	169.00	45.38
4	0.66	0.67	45.00	19.79	46.97	114.00	41.21
5	0.61	0.67	30.00	12.33	27.18	69.00	39.39
6	0.52	0.67	20.00	6.95	14.85	39.00	38.07
7	0.59	0.67	10.00	3.94	7.89	19.00	41.54
8	0.68	0.67	5.00	2.28	3.95	9.00	43.92
9	0.61	0.67	3.00	1.22	1.67	4.00	41.71
10	0.67	0.67	1.00	0.45	0.45	1.00	44.89
TOTAL			424.00				
FAR							
0	0.00	0.67	45.00	0.00	61.62	204.00	30.21
1	0.31	0.67	45.00	9.23	61.62	159.00	38.75
2	0.61	0.67	40.00	16.25	52.39	114.00	45.95
3	0.81	0.67	35.00	18.91	36.14	74.00	48.84
4	0.72	0.67	25.00	12.04	17.23	39.00	44.19
5	0.53	0.67	10.00	3.52	5.19	14.00	37.09
6	0.62	0.67	3.00	1.25	1.68	4.00	41.88
7	0.64	0.67	1.00	0.43	0.43	1.00	42.88
TOTAL			204.00				
COMBINED							
0			135.00	36.94	241.01	628.00	38.38
1			135.00	34.48	204.08	493.00	41.39
2			115.00	56.76	169.59	358.00	47.37
3			90.00	48.62	112.83	243.00	46.43
4			70.00	31.83	64.21	153.00	41.96
5			40.00	15.85	32.37	83.00	39.01
6			23.00	8.20	16.52	43.00	38.42
7			11.00	4.37	8.32	20.00	41.61
8			5.00	2.28	3.95	9.00	43.92
9			3.00	1.22	1.67	4.00	41.71
10			1.00	0.45	0.45	1.00	44.89
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.08	0.71	90.00	4.79	144.01	424.00	33.96
1	0.61	0.71	90.00	39.14	139.22	334.00	41.68
2	0.53	0.71	75.00	28.29	100.07	244.00	41.01
3	0.73	0.71	55.00	28.31	71.78	169.00	42.47
4	0.59	0.71	45.00	18.77	43.47	114.00	38.13
5	0.55	0.71	30.00	11.74	24.69	69.00	35.79
6	0.41	0.71	20.00	5.86	12.95	39.00	33.21
7	0.53	0.71	10.00	3.73	7.09	19.00	37.33
8	0.54	0.71	5.00	1.93	3.37	9.00	37.39
9	0.53	0.71	3.00	1.12	1.43	4.00	35.86
10	0.44	0.71	1.00	0.31	0.31	1.00	31.24
TOTAL			424.00				
FAR							
0	0.08	0.71	45.00	2.40	36.30	204.00	17.80
1	0.05	0.71	45.00	1.62	33.90	159.00	21.32
2	0.21	0.71	40.00	6.07	32.28	114.00	28.32
3	0.23	0.71	35.00	5.59	26.21	74.00	35.42
4	0.79	0.71	25.00	14.09	20.62	39.00	52.87
5	0.64	0.71	10.00	4.57	6.52	14.00	46.61
6	0.68	0.71	3.00	1.46	1.95	4.00	48.81
7	0.70	0.71	1.00	0.50	0.50	1.00	49.70
TOTAL			204.00				
COMBINED							
0			135.00	7.19	180.31	628.00	28.71
1			135.00	40.76	173.12	493.00	35.12
2			115.00	34.36	132.36	358.00	36.97
3			90.00	33.91	97.99	243.00	40.33
4'			70.00	32.87	64.08	153.00	41.89
5			40.00	16.32	31.22	83.00	37.61
6			23.00	7.31	14.90	43.00	34.66
7			11.00	4.22	7.59	20.00	37.95
8			5.00	1.93	3.37	9.00	37.39
9			3.00	1.12	1.43	4.00	35.86
10			1.00	0.31	0.31	1.00	31.24
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY/RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.38	0.67	90.00	22.99	138.69	424.00	32.71
1	0.41	0.67	90.00	24.88	115.70	334.00	34.64
2	0.42	0.67	75.00	21.04	90.83	244.00	37.22
3	0.61	0.67	55.00	22.34	69.78	169.00	41.29
4	0.59	0.67	45.00	17.90	47.44	114.00	41.61
5	0.40	0.67	30.00	8.07	29.53	69.00	42.80
6	0.92	0.67	20.00	12.31	21.47	39.00	55.04
7	0.76	0.67	10.00	5.07	9.15	19.00	48.17
8	0.63	0.67	5.00	2.10	4.09	9.00	45.41
9	0.74	0.67	3.00	1.49	1.99	4.00	49.75
10	0.75	0.67	1.00	0.50	0.50	1.00	50.25
TOTAL			424.00				
FAR							
0	0.00	0.67	45.00	0.00	56.29	204.00	27.59
1	0.25	0.67	45.00	7.54	56.29	159.00	35.40
2	0.72	0.67	40.00	19.26	48.75	114.00	42.76
3	0.72	0.67	35.00	16.86	29.49	74.00	39.85
4	0.51	0.67	25.00	8.59	12.63	39.00	32.38
5	0.39	0.67	10.00	2.64	4.04	14.00	28.86
6	0.59	0.67	3.00	1.19	1.40	4.00	35.01
7	0.32	0.67	1.00	0.21	0.21	1.00	21.44
TOTAL			204.00				
COMBINED							
0			135.00	22.99	194.98	628.00	31.05
1			135.00	32.41	171.99	493.00	34.89
2			115.00	40.31	139.57	358.00	38.99
3			90.00	39.20	99.27	243.00	40.85
4			70.00	26.49	60.07	153.00	39.26
5			40.00	10.71	33.57	83.00	40.45
6			23.00	13.50	22.87	43.00	53.18
7			11.00	5.28	9.37	20.00	46.83
8			5.00	2.10	4.09	9.00	45.41
9			3.00	1.49	1.99	4.00	49.75
10			1.00	0.50	0.50	1.00	50.25
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT/RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.66	90.00	0.00	111.45	424.00	26.29
1	0.61	0.66	90.00	36.01	111.45	334.00	33.37
2	0.59	0.66	75.00	29.27	75.44	244.00	30.92
3	0.20	0.66	55.00	7.40	46.17	169.00	27.32
4	0.43	0.66	45.00	12.81	38.78	114.00	34.01
5	0.43	0.66	30.00	8.54	25.96	69.00	37.63
6	0.70	0.66	20.00	9.24	17.42	39.00	44.68
7	0.60	0.66	10.00	3.96	8.18	19.00	43.07
8	0.68	0.66	5.00	2.25	4.22	9.00	46.93
9	0.74	0.66	3.00	1.47	1.97	4.00	49.34
10	0.77	0.66	1.00	0.51	0.51	1.00	50.82
TOTAL			424.00				
FAR							
0	0.00	0.66	45.00	0.00	27.69	204.00	13.57
1	0.00	0.66	45.00	0.00	27.69	159.00	17.41
2	0.42	0.66	40.00	11.06	27.69	114.00	24.29
3	0.33	0.66	35.00	7.51	16.63	74.00	22.48
4	0.38	0.66	25.00	6.19	9.12	39.00	23.39
5	0.31	0.66	10.00	2.07	2.93	14.00	20.93
6	0.19	0.66	3.00	0.38	0.86	4.00	21.62
7	0.73	0.66	1.00	0.48	0.48	1.00	48.18
TOTAL			204.00				
COMBINED							
0			135.00	0.00	139.14	628.00	22.16
1			135.00	36.01	139.14	493.00	28.22
2			115.00	40.33	103.13	358.00	28.81
3			90.00	14.91	62.81	243.00	25.85
4			70.00	19.00	47.90	153.00	31.30
5			40.00	10.61	28.89	83.00	34.81
6			23.00	9.62	18.29	43.00	42.53
7			11.00	4.44	8.67	20.00	43.33
8			5.00	2.25	4.22	9.00	46.93
9			3.00	1.47	1.97	4.00	49.34
10			1.00	0.51	0.51	1.00	50.82
TOTAL			628.00				

MIRROR: 40"
CONDITION: DAY
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.73	90.00	0.00	160.13	424.00	37.77
1	0.60	0.73	90.00	39.09	160.13	334.00	47.94
2	0.73	0.73	75.00	39.70	121.03	244.00	49.60
3	0.73	0.73	55.00	29.11	81.34	169.00	48.13
4	0.63	0.73	45.00	20.53	52.22	114.00	45.81
5	0.64	0.73	30.00	14.10	31.69	69.00	45.93
6	0.54	0.73	20.00	7.94	17.59	39.00	45.11
7	0.74	0.73	10.00	5.39	9.65	19.00	50.79
8	0.72	0.73	5.00	2.63	4.26	9.00	47.37
9	0.55	0.73	3.00	1.20	1.64	4.00	40.88
10	0.60	0.73	1.00	0.44	0.44	1.00	43.80
TOTAL			424.00				
FAR							
0	0.00	0.73	45.00	0.00	21.51	204.00	10.55
1	0.00	0.73	45.00	0.00	21.51	159.00	13.53
2	0.00	0.73	40.00	0.00	21.51	114.00	18.87
3	0.25	0.73	35.00	6.39	21.51	74.00	29.07
4	0.45	0.73	25.00	8.22	15.13	39.00	38.78
5	0.64	0.73	10.00	4.70	6.91	14.00	49.33
6	0.73	0.73	3.00	1.59	2.20	4.00	55.12
7	0.84	0.73	1.00	0.61	0.61	1.00	61.32
TOTAL			204.00				
COMBINED							
0			135.00	0.00	181.64	628.00	28.92
1			135.00	39.09	181.64	493.00	36.84
2			115.00	39.70	142.55	358.00	39.82
3			90.00	35.50	102.85	243.00	42.32
4			70.00	28.75	67.35	153.00	44.02
5			40.00	18.80	38.60	83.00	46.50
6			23.00	9.53	19.80	43.00	46.04
7			11.00	6.00	10.26	20.00	51.32
8			5.00	2.63	4.26	9.00	47.37
9			3.00	1.20	1.64	4.00	40.88
10			1.00	0.44	0.44	1.00	43.80
TOTAL			628.00				

MIRROR: 40"
CONDITION: NIGHT
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.68	90.00	0.00	113.05	424.00	26.66
1	0.00	0.68	90.00	0.00	113.05	334.00	33.85
2	0.59	0.68	75.00	29.84	113.05	244.00	46.33
3	0.81	0.68	55.00	30.16	83.21	169.00	49.24
4	0.79	0.68	45.00	24.29	53.05	114.00	46.54
5	0.53	0.68	30.00	10.84	28.76	69.00	41.69
6	0.51	0.68	20.00	6.97	17.92	39.00	45.96
7	0.82	0.68	10.00	5.57	10.95	19.00	57.66
8	0.82	0.68	5.00	2.79	5.39	9.00	59.84
9	1.00	0.68	3.00	2.04	2.60	4.00	64.94
10	0.82	0.68	1.00	0.56	0.56	1.00	55.76
TOTAL			424.00				
FAR							
0	0.00	0.68	45.00	0.00	7.86	204.00	3.85
1	0.00	0.68	45.00	0.00	7.86	159.00	4.94
2	0.00	0.68	40.00	0.00	7.86	114.00	6.90
3	0.00	0.68	35.00	0.00	7.86	74.00	10.62
4	0.00	0.68	25.00	0.00	7.86	39.00	20.16
5	0.84	0.68	10.00	5.70	7.86	14.00	56.15
6	0.84	0.68	3.00	1.71	2.16	4.00	54.06
7	0.66	0.68	1.00	0.45	0.45	1.00	44.88
TOTAL			204.00				
COMBINED							
0			135.00	0.00	120.91	628.00	19.25
1			135.00	0.00	120.91	493.00	24.53
2			115.00	29.84	120.91	358.00	33.77
3			90.00	30.16	91.07	243.00	37.48
4			70.00	24.29	60.91	153.00	39.81
5			40.00	16.54	36.62	83.00	44.13
6			23.00	8.68	20.09	43.00	46.71
7			11.00	6.02	11.40	20.00	57.02
8			5.00	2.79	5.39	9.00	59.84
9			3.00	2.04	2.60	4.00	64.94
10			1.00	0.56	0.56	1.00	55.76
TOTAL			628.00				

MIRROR: 40"
CONDITION: DAY/RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.00	0.76	90.00	0.00	143.42	424.00	33.83
1	0.42	0.76	90.00	28.64	143.42	334.00	42.94
2	0.61	0.76	75.00	34.91	114.78	244.00	47.04
3	0.42	0.76	55.00	17.51	79.86	169.00	47.25
4	0.59	0.76	45.00	20.31	62.35	114.00	54.69
5	0.73	0.76	30.00	16.53	42.04	69.00	60.93
6	0.81	0.76	20.00	12.26	25.51	39.00	65.42
7	1.00	0.76	10.00	7.60	13.25	19.00	69.76
8	0.92	0.76	5.00	3.50	5.65	9.00	62.83
9	0.71	0.76	3.00	1.61	2.16	4.00	53.96
10	0.72	0.76	1.00	0.55	0.55	1.00	54.72
TOTAL			424.00				
FAR							
0	0.00	0.76	45.00	0.00	34.53	204.00	16.92
1	0.00	0.76	45.00	0.00	34.53	159.00	21.71
2	0.00	0.76	40.00	0.00	34.53	114.00	30.29
3	0.25	0.76	35.00	6.65	34.53	74.00	46.66
4	1.00	0.76	25.00	19.00	27.88	39.00	71.48
5	0.82	0.76	10.00	6.22	8.88	14.00	63.41
6	0.92	0.76	3.00	2.10	2.65	4.00	66.31
7	0.73	0.76	1.00	0.55	0.55	1.00	55.48
TOTAL			204.00				
COMBINED							
0			135.00	0.00	177.95	628.00	28.34
1			135.00	28.64	177.95	493.00	36.09
2			115.00	34.91	149.30	358.00	41.70
3			90.00	24.16	114.39	243.00	47.07
4			70.00	39.31	90.23	153.00	58.97
5			40.00	22.75	50.92	83.00	61.35
6			23.00	14.36	28.17	43.00	65.50
7			11.00	8.15	13.81	20.00	69.05
8			5.00	3.50	5.65	9.00	62.83
9			3.00	1.61	2.16	4.00	53.96
10			1.00	0.55	0.55	1.00	54.72
TOTAL			628.00				

MIRROR: 40"
CONDITION: NIGHT/RN
SIDE: RIGHT

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. S
ADJACENT							
0	0.00	0.64	90.00	0.00	117.26	424.00	27.66
1	0.00	0.64	90.00	0.00	117.26	334.00	35.11
2	0.80	0.64	75.00	38.16	117.26	244.00	48.06
3	0.80	0.64	55.00	28.00	79.10	169.00	46.80
4	0.53	0.64	45.00	15.30	51.10	114.00	44.82
5	0.84	0.64	30.00	16.08	35.80	69.00	51.88
6	0.84	0.64	20.00	10.72	19.71	39.00	50.54
7	0.84	0.64	10.00	5.36	8.99	19.00	47.33
8	0.73	0.64	5.00	2.32	3.63	9.00	40.32
9	0.43	0.64	3.00	0.83	1.31	4.00	32.64
10	0.74	0.64	1.00	0.47	0.47	1.00	47.36
TOTAL			424.00				
FAR							
0	0.00	0.64	45.00	0.00	6.78	204.00	3.33
1	0.00	0.64	45.00	0.00	6.78	159.00	4.27
2	0.00	0.64	40.00	0.00	6.78	114.00	5.95
3	0.00	0.64	35.00	0.00	6.78	74.00	9.17
4	0.00	0.64	25.00	0.00	6.78	39.00	17.39
5	0.74	0.64	10.00	4.72	6.78	14.00	48.46
6	0.80	0.64	3.00	1.54	2.06	4.00	51.52
7	0.82	0.64	1.00	0.52	0.52	1.00	52.48
TOTAL			204.00				
COMBINED							
0			135.00	0.00	124.04	628.00	19.75
1			135.00	0.00	124.04	493.00	25.16
2			115.00	38.16	124.04	358.00	34.65
3			90.00	28.00	85.88	243.00	35.34
4			70.00	15.30	57.88	153.00	37.83
5			40.00	20.81	42.58	83.00	51.30
6			23.00	12.26	21.77	43.00	50.63
7			11.00	5.89	9.52	20.00	47.58
8			5.00	2.32	3.63	9.00	40.32
9			3.00	0.83	1.31	4.00	32.64
10			1.00	0.47	0.47	1.00	47.36
TOTAL			628.00				

Appendix D Performance Summary (Session III)

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.36	0.65	90.00	21.06	121.61	424.00	28.68
1	0.37	0.65	90.00	21.65	100.55	334.00	30.10
2	0.38	0.65	75.00	18.53	78.90	244.00	32.34
3	0.54	0.65	55.00	19.31	60.38	169.00	35.73
4	0.61	0.65	45.00	17.84	41.07	114.00	36.03
5	0.65	0.52	30.00	10.14	23.23	69.00	33.67
6	0.69	0.52	20.00	7.18	13.09	39.00	33.56
7	0.59	0.52	10.00	3.07	5.91	19.00	31.13
8	0.67	0.51	5.00	1.71	2.85	9.00	31.62
9	0.56	0.51	3.00	0.86	1.14	4.00	28.43
10	0.55	0.51	1.00	0.28	0.28	1.00	28.05
TOTAL			424.00				
FAR							
0	0.17	0.76	45.00	5.81	63.76	204.00	31.26
1	0.32	0.76	45.00	10.94	57.95	159.00	36.45
2	0.71	0.76	40.00	21.58	47.01	114.00	41.23
3	0.44	0.76	35.00	11.70	25.42	74.00	34.35
4	0.44	0.76	25.00	8.36	13.72	39.00	35.18
5	0.65	0.68	10.00	4.42	5.36	14.00	38.27
6	0.32	0.68	3.00	0.65	0.94	4.00	23.46
7	0.42	0.68	1.00	0.29	0.29	1.00	28.56
TOTAL			204.00				
COMBINED							
0			135.00	26.87	185.37	628.00	29.52
1			135.00	32.59	158.50	493.00	32.15
2			115.00	40.11	125.91	358.00	35.17
3			90.00	31.01	85.80	243.00	35.31
4			70.00	26.20	54.79	153.00	35.81
5			40.00	14.56	28.59	83.00	34.44
6			23.00	7.83	14.03	43.00	32.62
7			11.00	3.35	6.20	20.00	31.00
8			5.00	1.71	2.85	9.00	31.62
9			3.00	0.86	1.14	4.00	28.43
10			1.00	0.28	0.28	1.00	28.05
TOTAL			628.00				

MIRROR: NON-SPHERICAL (Y)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.22	0.65	90.00	12.87	131.86	424.00	31.10
1	0.37	0.65	90.00	21.65	118.99	334.00	35.63
2	0.63	0.65	75.00	30.71	97.35	244.00	39.90
3	0.54	0.65	55.00	19.31	66.63	169.00	39.43
4	0.77	0.65	45.00	22.52	47.33	114.00	41.52
5	0.59	0.52	30.00	9.20	24.81	69.00	35.95
6	0.83	0.52	20.00	8.63	15.60	39.00	40.01
7	0.76	0.52	10.00	3.95	6.97	19.00	36.69
8	0.73	0.51	5.00	1.86	3.02	9.00	33.55
9	0.56	0.51	3.00	0.86	1.16	4.00	28.94
10	0.59	0.51	1.00	0.30	0.30	1.00	30.09
TOTAL			424.00				
FAR							
0	0.17	0.76	45.00	5.81	53.97	204.00	26.45
1	0.29	0.76	45.00	9.92	48.15	159.00	30.28
2	0.45	0.76	40.00	13.68	38.23	114.00	33.54
3	0.57	0.76	35.00	15.16	24.55	74.00	33.18
4	0.30	0.76	25.00	5.70	9.39	39.00	24.08
5	0.36	0.68	10.00	2.45	3.69	14.00	26.37
6	0.49	0.68	3.00	1.00	1.24	4.00	31.11
7	0.36	0.68	1.00	0.24	0.24	1.00	24.48
TOTAL			204.00				
COMBINED							
0			135.00	18.68	185.83	628.00	29.59
1			135.00	31.56	167.14	493.00	33.90
2			115.00	44.39	135.58	358.00	37.87
3			90.00	34.47	91.19	243.00	37.53
4			70.00	28.22	56.72	153.00	37.07
5			40.00	11.65	28.50	83.00	34.34
6			23.00	9.63	16.85	43.00	39.18
7			11.00	4.20	7.22	20.00	36.08
8			5.00	1.86	3.02	9.00	33.55
9			3.00	0.86	1.16	4.00	28.94
10			1.00	0.30	0.30	1.00	30.09
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.39	0.65	90.00	22.82	149.72	424.00	35.31
1	0.60	0.65	90.00	35.10	126.90	334.00	37.99
2	0.50	0.65	75.00	24.38	91.80	244.00	37.62
3	0.78	0.65	55.00	27.89	67.43	169.00	39.90
4	0.54	0.65	45.00	15.80	39.54	114.00	34.69
5	0.65	0.52	30.00	10.14	23.75	69.00	34.42
6	0.76	0.52	20.00	7.90	13.61	39.00	34.89
7	0.57	0.52	10.00	2.96	5.70	19.00	30.01
8	0.62	0.51	5.00	1.58	2.74	9.00	30.43
9	0.57	0.51	3.00	0.87	1.16	4.00	28.94
10	0.56	0.51	1.00	0.29	0.29	1.00	28.56
TOTAL			424.00				
FAR							
0	0.17	0.76	45.00	5.81	74.30	204.00	36.42
1	0.40	0.76	45.00	13.68	68.48	159.00	43.07
2	0.78	0.76	40.00	23.71	54.80	114.00	48.07
3	0.60	0.76	35.00	15.96	31.09	74.00	42.01
4	0.52	0.76	25.00	9.88	15.13	39.00	38.79
5	0.65	0.68	10.00	4.42	5.25	14.00	37.50
6	0.26	0.68	3.00	0.53	0.83	4.00	20.74
7	0.44	0.68	1.00	0.30	0.30	1.00	29.92
TOTAL			204.00				
COMBINED							
0			135.00	28.63	224.01	628.00	35.67
1			135.00	48.78	195.38	493.00	39.63
2			115.00	48.09	146.60	358.00	40.95
3			90.00	43.85	98.52	243.00	40.54
4			70.00	25.68	54.67	153.00	35.73
5			40.00	14.56	29.00	83.00	34.94
6			23.00	8.43	14.44	43.00	33.57
7			11.00	3.26	6.00	20.00	30.01
8			5.00	1.58	2.74	9.00	30.43
9			3.00	0.87	1.16	4.00	28.94
10			1.00	0.29	0.29	1.00	28.56
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.34	0.65	90.00	19.89	146.11	424.00	34.46
1	0.87	0.65	90.00	50.90	126.22	334.00	37.79
2	0.25	0.65	75.00	12.19	75.33	244.00	30.87
3	0.66	0.65	55.00	23.60	63.14	169.00	37.36
4	0.62	0.65	45.00	18.14	39.54	114.00	34.69
5	0.61	0.52	30.00	9.52	21.41	69.00	31.03
6	0.58	0.52	20.00	6.03	11.89	39.00	30.49
7	0.57	0.52	10.00	2.96	5.86	19.00	30.85
8	0.63	0.51	5.00	1.61	2.90	9.00	32.19
9	0.64	0.51	3.00	0.98	1.29	4.00	32.26
10	0.61	0.51	1.00	0.31	0.31	1.00	31.11
TOTAL			424.00				
FAR							
0	0.33	0.76	45.00	11.29	75.11	204.00	36.82
1	0.29	0.76	45.00	9.92	63.82	159.00	40.14
2	0.77	0.76	40.00	23.41	53.90	114.00	47.28
3	0.69	0.76	35.00	18.35	30.49	74.00	41.21
4	0.44	0.76	25.00	8.36	12.14	39.00	31.13
5	0.37	0.68	10.00	2.52	3.78	14.00	27.01
6	0.50	0.68	3.00	1.02	1.26	4.00	31.62
7	0.36	0.68	1.00	0.24	0.24	1.00	24.48
TOTAL			204.00				
COMBINED							
0			135.00	31.18	221.22	628.00	35.23
1			135.00	60.81	190.04	493.00	38.55
2			115.00	35.60	129.23	358.00	36.10
3			90.00	41.95	93.63	243.00	38.53
4			70.00	26.50	51.68	153.00	33.78
5			40.00	12.03	25.19	83.00	30.35
6			23.00	7.05	13.16	43.00	30.60
7			11.00	3.21	6.11	20.00	30.53
8			5.00	1.61	2.90	9.00	32.19
9			3.00	0.98	1.29	4.00	32.26
10			1.00	0.31	0.31	1.00	31.11
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.42	0.65	90.00	24.57	185.38	424.00	43.72
1	0.76	0.65	90.00	44.46	160.81	334.00	48.15
2	0.66	0.65	75.00	32.18	116.35	244.00	47.68
3	0.91	0.65	55.00	32.53	84.17	169.00	49.80
4	0.91	0.65	45.00	26.62	51.64	114.00	45.30
5	0.79	0.52	30.00	12.32	25.02	69.00	36.26
6	0.64	0.52	20.00	6.66	12.70	39.00	32.55
7	0.73	0.52	10.00	3.80	6.04	19.00	31.79
8	0.37	0.51	5.00	0.94	2.24	9.00	24.93
9	0.68	0.51	3.00	1.04	1.30	4.00	32.51
10	0.51	0.51	1.00	0.26	0.26	1.00	26.01
TOTAL			424.00				
FAR							
0	0.33	0.76	45.00	11.29	80.24	204.00	39.33
1	0.33	0.76	45.00	11.29	68.95	159.00	43.36
2	0.69	0.76	40.00	20.98	57.66	114.00	50.58
3	0.66	0.76	35.00	17.56	36.69	74.00	49.58
4	0.76	0.76	25.00	14.44	19.13	39.00	49.06
5	0.48	0.68	10.00	3.26	4.69	14.00	33.51
6	0.49	0.68	3.00	1.00	1.43	4.00	35.70
7	0.63	0.68	1.00	0.43	0.43	1.00	42.84
TOTAL			204.00				
COMBINED							
0			135.00	35.86	265.61	628.00	42.29
1			135.00	55.75	229.76	493.00	46.60
2			115.00	53.15	174.01	358.00	48.61
3			90.00	50.09	120.86	243.00	49.74
4			70.00	41.06	70.77	153.00	46.25
5			40.00	15.59	29.71	83.00	35.80
6			23.00	7.66	14.12	43.00	32.85
7			11.00	4.22	6.47	20.00	32.34
8			5.00	0.94	2.24	9.00	24.93
9			3.00	1.04	1.30	4.00	32.51
10			1.00	0.26	0.26	1.00	26.01
TOTAL			628.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.51	0.65	90.00	29.84	158.79	424.00	37.45
1	0.51	0.65	90.00	29.84	128.96	334.00	38.61
2	0.51	0.65	75.00	24.86	99.12	244.00	40.62
3	0.57	0.65	55.00	20.38	74.26	169.00	43.94
4	0.91	0.65	45.00	26.62	53.88	114.00	47.27
5	0.79	0.52	30.00	12.32	27.27	69.00	39.52
6	0.85	0.52	20.00	8.84	14.94	39.00	38.31
7	0.64	0.52	10.00	3.33	6.10	19.00	32.12
8	0.61	0.51	5.00	1.56	2.77	9.00	30.83
9	0.56	0.51	3.00	0.86	1.22	4.00	30.47
10	0.71	0.51	1.00	0.36	0.36	1.00	36.21
TOTAL			424.00				
FAR							
0	0.33	0.76	45.00	11.29	83.68	204.00	41.02
1	0.33	0.76	45.00	11.29	72.40	159.00	45.53
2	0.91	0.76	40.00	27.66	61.11	114.00	53.61
3	0.64	0.76	35.00	17.02	33.45	74.00	45.20
4	0.63	0.76	25.00	11.97	16.42	39.00	42.11
5	0.49	0.68	10.00	3.33	4.45	14.00	31.81
6	0.47	0.68	3.00	0.96	1.12	4.00	28.05
7	0.24	0.68	1.00	0.16	0.16	1.00	16.32
TOTAL			204.00				
COMBINED							
0			135.00	41.12	242.48	628.00	38.61
1			135.00	41.12	201.36	493.00	40.84
2			115.00	52.53	160.24	358.00	44.76
3			90.00	37.40	107.71	243.00	44.32
4			70.00	38.59	70.31	153.00	45.95
5			40.00	15.66	31.72	83.00	38.22
6			23.00	9.80	16.06	43.00	37.36
7			11.00	3.49	6.27	20.00	31.33
8			5.00	1.56	2.77	9.00	30.83
9			3.00	0.86	1.22	4.00	30.47
10			1.00	0.36	0.36	1.00	36.21
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM SC.
ADJACENT							
0	0.64	0.80	90.00	46.08	174.21	424.00	41.09
1	0.50	0.80	90.00	36.00	128.13	334.00	38.36
2	0.38	0.80	75.00	22.80	92.13	244.00	37.76
3	0.38	0.80	55.00	16.72	69.33	169.00	41.02
4	0.45	0.80	45.00	16.20	52.61	114.00	46.14
5	0.74	0.73	30.00	16.21	36.41	69.00	52.76
6	0.73	0.73	20.00	10.66	20.20	39.00	51.79
7	0.79	0.73	10.00	5.77	9.54	19.00	50.22
8	0.74	0.60	5.00	2.22	3.77	9.00	41.93
9	0.59	0.60	3.00	1.06	1.55	4.00	38.85
10	0.82	0.60	1.00	0.49	0.49	1.00	49.20
TOTAL			424.00				
FAR							
0	0.00	0.86	45.00	0.00	63.07	204.00	30.92
1	0.00	0.86	45.00	0.00	63.07	159.00	39.67
2	0.69	0.86	40.00	23.74	63.07	114.00	55.32
3	0.66	0.86	35.00	19.87	39.33	74.00	53.15
4	0.66	0.86	25.00	14.19	19.47	39.00	49.92
5	0.59	0.70	10.00	4.13	5.28	14.00	37.70
6	0.35	0.70	3.00	0.74	1.15	4.00	28.70
7	0.59	0.70	1.00	0.41	0.41	1.00	41.30
TOTAL			204.00				
COMBINED							
0			135.00	46.08	237.28	628.00	37.78
1			135.00	36.00	191.20	493.00	38.78
2			115.00	46.54	155.20	358.00	43.35
3			90.00	36.59	108.66	243.00	44.72
4			70.00	30.39	72.07	153.00	47.11
5			40.00	20	41.68	83.00	50.22
6			23.00	11.	21.35	43.00	49.64
7			11.00	6.18	9.95	20.00	49.77
8			5.00	2.22	3.77	9.00	41.93
9			3.00	1.06	1.55	4.00	38.85
10			1.00	0.49	0.49	1.00	49.20
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.39	0.80	90.00	28.08	169.49	424.00	39.97
1	0.51	0.80	90.00	36.72	141.41	334.00	42.34
2	0.50	0.80	75.00	30.00	104.69	244.00	42.91
3	0.45	0.80	55.00	19.80	74.69	169.00	44.19
4	0.71	0.80	45.00	25.56	54.89	114.00	48.15
5	0.46	0.73	30.00	10.07	29.33	69.00	42.51
6	0.83	0.73	20.00	12.12	19.26	39.00	49.37
7	0.45	0.73	10.00	3.29	7.14	19.00	37.56
8	0.81	0.60	5.00	2.43	3.85	9.00	42.80
9	0.50	0.60	3.00	0.90	1.42	4.00	35.55
10	0.87	0.60	1.00	0.52	0.52	1.00	52.20
TOTAL			424.00				
FAR							
0	0.00	0.86	45.00	0.00	57.56	204.00	28.21
1	0.00	0.86	45.00	0.00	57.56	159.00	36.20
2	0.77	0.86	40.00	26.49	57.56	114.00	50.49
3	0.51	0.86	35.00	15.35	31.07	74.00	41.98
4	0.41	0.86	25.00	8.82	15.72	39.00	40.30
5	0.71	0.70	10.00	4.97	6.90	14.00	49.30
6	0.79	0.70	3.00	1.66	1.93	4.00	48.30
7	0.39	0.70	1.00	0.27	0.27	1.00	27.30
TOTAL			204.00				
COMBINED							
0			135.00	28.08	227.05	628.00	36.15
1			135.00	36.72	198.97	493.00	40.36
2			115.00	56.49	162.25	358.00	45.32
3			90.00	35.15	105.76	243.00	43.52
4			70.00	34.38	70.61	153.00	46.15
5			40.00	15.04	36.23	83.00	43.65
6			23.00	13.78	21.19	43.00	49.27
7			11.00	3.56	7.41	20.00	37.05
8			5.00	2.43	3.85	9.00	42.80
9			3.00	0.90	1.42	4.00	35.55
10			1.00	0.52	0.52	1.00	52.20
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.51	0.80	90.00	36.72	183.84	424.00	43.36
1	0.51	0.80	90.00	36.72	147.12	334.00	44.05
2	0.51	0.80	75.00	30.60	110.40	244.00	45.24
3	0.71	0.80	55.00	31.24	79.80	169.00	47.22
4	0.47	0.80	45.00	16.92	48.56	114.00	42.59
5	0.60	0.73	30.00	13.14	31.64	69.00	45.85
6	0.59	0.73	20.00	8.61	18.50	39.00	47.42
7	0.77	0.73	10.00	5.62	9.88	19.00	52.01
8	0.82	0.60	5.00	2.46	4.26	9.00	47.33
9	0.73	0.60	3.00	1.31	1.80	4.00	45.00
10	0.81	0.60	1.00	0.49	0.49	1.00	48.60
TOTAL			424.00				
FAR							
0	0.17	0.86	45.00	6.58	92.85	204.00	45.51
1	0.29	0.86	45.00	11.22	86.27	159.00	54.26
2	0.81	0.86	40.00	27.86	75.04	114.00	65.83
3	0.91	0.86	35.00	27.39	47.18	74.00	63.76
4	0.63	0.86	25.00	13.55	19.79	39.00	50.74
5	0.71	0.70	10.00	4.97	6.24	14.00	44.60
6	0.37	0.70	3.00	0.78	1.27	4.00	31.85
7	0.71	0.70	1.00	0.50	0.50	1.00	49.70
TOTAL			204.00				
COMBINED							
0			135.00	43.30	276.68	628.00	44.06
1			135.00	47.94	233.38	493.00	47.34
2			115.00	58.46	185.44	358.00	51.80
3			90.00	58.63	126.98	243.00	52.25
4			70.00	30.47	68.34	153.00	44.67
5			40.00	18.11	37.88	83.00	45.64
6			23.00	9.39	19.77	43.00	45.97
7			11.00	6.12	10.38	20.00	51.89
8			5.00	2.46	4.26	9.00	47.33
9			3.00	1.31	1.80	4.00	45.00
10			1.00	0.49	0.49	1.00	48.60
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.22	0.80	90.00	15.84	145.00	424.00	34.20
1	0.38	0.80	90.00	27.36	129.16	334.00	38.67
2	0.50	0.80	75.00	30.00	101.80	244.00	41.72
3	0.45	0.80	55.00	19.80	71.80	169.00	42.48
4	0.57	0.80	45.00	20.52	52.00	114.00	45.61
5	0.63	0.73	30.00	13.80	31.48	69.00	45.62
6	0.65	0.73	20.00	9.49	17.68	39.00	45.33
7	0.64	0.73	10.00	4.67	8.19	19.00	43.09
8	0.52	0.60	5.00	1.56	3.52	9.00	39.07
9	0.83	0.60	3.00	1.49	1.96	4.00	48.90
10	0.77	0.60	1.00	0.46	0.46	1.00	46.20
TOTAL			424.00				
FAR							
0	0.33	0.86	45.00	12.77	89.16	204.00	43.70
1	0.29	0.86	45.00	11.22	76.39	159.00	48.04
2	0.62	0.86	40.00	21.33	65.16	114.00	57.16
3	0.78	0.86	35.00	23.48	43.84	74.00	59.24
4	0.66	0.86	25.00	14.19	20.36	39.00	52.20
5	0.65	0.70	10.00	4.55	6.17	14.00	44.05
6	0.68	0.70	3.00	1.43	1.62	4.00	40.43
7	0.27	0.70	1.00	0.19	0.19	1.00	18.90
TOTAL			204.00				
COMBINED							
0			135.00	28.61	234.15	628.00	37.29
1			135.00	38.58	205.54	493.00	41.69
2			115.00	51.33	166.96	358.00	46.64
3			90.00	43.28	115.63	243.00	47.58
4			70.00	34.71	72.35	153.00	47.29
5			40.00	18.35	37.64	83.00	45.35
6			23.00	10.92	19.30	43.00	44.87
7			11.00	4.86	8.38	20.00	41.89
8			5.00	1.56	3.52	9.00	39.07
9			3.00	1.49	1.96	4.00	48.90
10			1.00	0.46	0.46	1.00	46.20
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.27	0.80	90.00	19.44	151.88	424.00	35.82
1	0.51	0.80	90.00	36.72	132.44	334.00	39.65
2	0.27	0.80	75.00	16.20	95.72	244.00	39.23
3	0.51	0.80	55.00	22.44	79.52	169.00	47.06
4	0.51	0.80	45.00	18.36	57.08	114.00	50.07
5	0.75	0.73	30.00	16.43	38.72	69.00	56.12
6	0.91	0.73	20.00	13.29	22.30	39.00	57.17
7	0.66	0.73	10.00	4.82	9.01	19.00	47.43
8	0.76	0.60	5.00	2.28	4.19	9.00	46.60
9	0.76	0.60	3.00	1.37	1.91	4.00	47.85
10	0.91	0.60	1.00	0.55	0.55	1.00	54.60
TOTAL			424.00				
FAR							
0	0.33	0.86	45.00	12.77	88.56	204.00	43.41
1	0.24	0.86	45.00	9.29	75.79	159.00	47.67
2	0.66	0.86	40.00	22.70	66.50	114.00	58.34
3	0.81	0.86	35.00	24.38	43.80	74.00	59.19
4	0.66	0.86	25.00	14.19	19.42	39.00	49.79
5	0.41	0.70	10.00	2.87	5.23	14.00	37.35
6	0.91	0.70	3.00	1.91	2.36	4.00	58.98
7	0.64	0.70	1.00	0.45	0.45	1.00	44.80
TOTAL			204.00				
COMBINED							
0			135.00	32.21	240.45	628.00	38.29
1			135.00	46.01	208.24	493.00	42.24
2			115.00	38.90	162.23	358.00	45.31
3			90.00	46.82	123.32	243.00	50.75
4			70.00	32.55	76.50	153.00	50.00
5			40.00	19.30	43.95	83.00	52.95
6			23.00	15.20	24.66	43.00	57.34
7			11.00	5.27	9.46	20.00	47.30
8			5.00	2.28	4.19	9.00	46.60
9			3.00	1.37	1.91	4.00	47.85
10			1.00	0.55	0.55	1.00	54.60
TOTAL			628.00				

MIRROR: 20"
CONDITION: DAY
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
ADJACENT							
0	0.42	0.80	90.00	30.24	155.10	424.00	36.58
1	0.51	0.80	90.00	36.72	124.86	334.00	37.38
2	0.26	0.80	75.00	15.60	88.14	244.00	36.12
3	0.51	0.80	55.00	22.44	72.54	169.00	42.92
4	0.66	0.80	45.00	23.76	50.10	114.00	43.94
5	0.26	0.73	30.00	5.69	26.34	69.00	38.17
6	0.81	0.73	20.00	11.83	20.64	39.00	52.93
7	0.81	0.73	10.00	5.91	8.82	19.00	46.41
8	0.39	0.60	5.00	1.17	2.90	9.00	32.27
9	0.76	0.60	3.00	1.37	1.73	4.00	43.35
10	0.61	0.60	1.00	0.37	0.37	1.00	36.60
TOTAL			424.00				
FAR							
0	0.25	0.86	45.00	9.68	93.28	204.00	45.73
1	0.18	0.86	45.00	6.97	83.61	159.00	52.58
2	0.91	0.86	40.00	31.30	76.64	114.00	67.23
3	0.76	0.86	35.00	22.88	45.34	74.00	61.26
4	0.72	0.86	25.00	15.48	22.46	39.00	57.59
5	0.66	0.70	10.00	4.62	6.98	14.00	49.85
6	0.91	0.70	3.00	1.91	2.36	4.00	58.98
7	0.64	0.70	1.00	0.45	0.45	1.00	44.80
TOTAL			204.00				
COMBINED							
0			135.00	39.92	248.38	628.00	39.55
1			135.00	43.69	208.46	493.00	42.28
2			115.00	46.90	164.78	358.00	46.03
3			90.00	45.32	117.87	243.00	48.51
4			70.00	39.24	72.56	153.00	47.42
5			40.00	10.31	33.32	83.00	40.14
6			23.00	13.74	23.00	43.00	53.49
7			11.00	6.36	9.27	20.00	46.33
8			5.00	1.17	2.90	9.00	32.27
9			3.00	1.37	1.73	4.00	43.35
10			1.00	0.37	0.37	1.00	36.60
TOTAL			628.00				

MIRROR: NON-SHPERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.30	0.64	67.50	12.86	95.68	314.00	30.47
1	0.44	0.64	67.50	18.86	82.82	246.50	33.60
2	0.59	0.64	57.50	21.54	63.96	179.00	35.73
3	0.64	0.64	45.00	18.29	42.42	121.50	34.91
4	0.54	0.64	35.00	12.00	24.13	76.50	31.55
5	0.54	0.57	20.00	6.16	12.13	41.50	29.23
6	0.50	0.57	11.50	3.28	5.97	21.50	27.79
7	0.50	0.57	5.50	1.57	2.70	10.00	26.97
8	0.58	0.47	2.50	0.67	1.13	4.50	25.11
9	0.49	0.47	1.50	0.34	0.46	2.00	22.79
10	0.49	0.47	0.50	0.11	0.11	0.50	22.79
TOTAL			314.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.38	0.64	67.50	16.29	121.37	314.00	38.65
1	0.83	0.64	67.50	35.58	105.08	246.50	42.63
2	0.58	0.64	57.50	21.18	69.51	179.00	38.83
3	0.74	0.64	45.00	21.15	48.33	121.50	39.78
4	0.61	0.64	35.00	13.56	27.19	76.50	35.54
5	0.53	0.57	20.00	6.04	13.63	41.50	32.84
6	0.69	0.57	11.50	4.52	7.59	21.50	35.29
7	0.68	0.57	5.50	2.13	3.06	10.00	30.64
8	0.68	0.47	2.50	0.79	0.93	4.50	20.72
9		0.47	1.50	0.00	0.14	2.00	7.09
10	0.61	0.47	0.50	0.14	0.14	0.50	28.37
TOTAL			314.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.38	0.64	67.50	16.29	121.83	314.00	38.80
1	0.83	0.64	67.50	35.58	105.54	246.50	42.81
2	0.58	0.64	57.50	21.18	69.96	179.00	39.09
3	0.74	0.64	45.00	21.15	48.79	121.50	40.15
4	0.61	0.64	35.00	13.56	27.64	76.50	36.13
5	0.53	0.57	20.00	6.04	14.08	41.50	33.93
6	0.69	0.57	11.50	4.52	8.04	21.50	37.40
7	0.68	0.57	5.50	2.13	3.52	10.00	35.18
8	0.68	0.47	2.50	0.79	1.39	4.50	30.79
9	0.65	0.47	1.50	0.45	0.60	2.00	29.76
10	0.61	0.47	0.50	0.14	0.14	0.50	28.37
TOTAL			314.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.40	0.64	67.50	17.15	83.82	314.00	26.70
1	0.39	0.64	67.50	16.72	66.68	246.50	27.05
2	0.47	0.64	57.50	17.16	49.96	179.00	27.91
3	0.47	0.64	45.00	13.43	32.80	121.50	27.00
4	0.39	0.64	35.00	8.67	19.37	76.50	25.32
5	0.34	0.57	20.00	3.88	10.70	41.50	25.79
6	0.57	0.57	11.50	3.74	6.83	21.50	31.75
7	0.56	0.57	5.50	1.76	3.09	10.00	30.90
8	0.61	0.47	2.50	0.71	1.33	4.50	29.66
9	0.66	0.47	1.50	0.46	0.63	2.00	31.27
10	0.71	0.47	0.50	0.17	0.17	0.50	33.02
TOTAL			314.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.33	0.64	67.50	14.14	93.78	314.00	29.87
1	0.50	0.64	67.50	21.43	79.63	246.50	32.30
2	0.62	0.64	57.50	22.64	58.20	179.00	32.51
3	0.52	0.64	45.00	14.86	35.56	121.50	29.27
4	0.39	0.64	35.00	8.67	20.70	76.50	27.06
5	0.42	0.57	20.00	4.79	12.04	41.50	29.00
6	0.64	0.57	11.50	4.20	7.25	21.50	33.71
7	0.60	0.57	5.50	1.88	3.05	10.00	30.53
8	0.51	0.47	2.50	0.59	1.17	4.50	26.04
9	0.64	0.47	1.50	0.45	0.58	2.00	28.95
10	0.57	0.47	0.50	0.13	0.13	0.50	26.51
TOTAL			314.00				

MIRROR: NON-SPHERICAL (V)
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.31	0.64	67.50	13.29	91.71	314.00	29.21
1	0.66	0.64	67.50	28.29	78.43	246.50	31.82
2	0.44	0.64	57.50	16.07	50.14	179.00	28.01
3	0.44	0.64	45.00	12.57	34.07	121.50	28.04
4	0.38	0.64	35.00	8.45	21.50	76.50	28.10
5	0.51	0.57	20.00	5.81	13.05	41.50	31.45
6	0.60	0.57	11.50	3.93	7.24	21.50	33.67
7	0.61	0.57	5.50	1.91	3.31	10.00	33.05
8	0.66	0.47	2.50	0.77	1.39	4.50	30.95
9	0.67	0.47	1.50	0.47	0.63	2.00	31.27
10	0.68	0.47	0.50	0.16	0.16	0.50	31.62
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.13	0.78	67.50	6.84	114.14	314.00	36.35
1	0.46	0.78	67.50	24.22	107.30	246.50	43.53
2	0.63	0.78	57.50	28.26	83.08	179.00	46.41
3	0.56	0.78	45.00	19.66	54.82	121.50	45.12
4	0.67	0.78	35.00	18.29	35.17	76.50	45.97
5	0.63	0.65	20.00	8.19	16.88	41.50	40.66
6	0.67	0.65	11.50	5.01	8.69	21.50	40.40
7	0.63	0.65	5.50	2.25	3.68	10.00	36.77
8	0.53	0.55	2.50	0.72	1.43	4.50	31.67
9	0.59	0.55	1.50	0.48	0.70	2.00	35.15
10	0.81	0.55	0.50	0.22	0.22	0.50	44.15
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 0
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.25	0.78	67.50	13.16	119.98	314.00	38.21
1	0.75	0.78	67.50	39.49	106.81	246.50	43.33
2	0.44	0.78	57.50	19.73	67.33	179.00	37.61
3	0.58	0.78	45.00	20.36	47.59	121.50	39.17
4	0.60	0.78	35.00	16.38	27.23	76.50	35.60
5	0.35	0.65	20.00	4.55	10.85	41.50	26.15
6	0.47	0.65	11.50	3.51	6.30	21.50	29.32
7	0.32	0.65	5.50	1.14	2.79	10.00	27.90
8	0.60	0.55	2.50	0.82	1.65	4.50	36.58
9	0.73	0.55	1.50	0.60	0.83	2.00	41.42
10	0.85	0.55	0.50	0.23	0.23	0.50	46.33
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.94	0.78	67.50	49.49	181.26	314.00	57.73
1	0.78	0.78	67.50	41.07	131.77	246.50	53.46
2	0.77	0.78	57.50	34.53	90.71	179.00	50.67
3	0.56	0.78	45.00	19.66	56.17	121.50	46.23
4	0.74	0.78	35.00	20.20	36.52	76.50	47.73
5	0.56	0.65	20.00	7.28	16.31	41.50	39.31
6	0.62	0.65	11.50	4.63	9.03	21.50	42.01
7	0.77	0.65	5.50	2.75	4.40	10.00	43.99
8	0.65	0.55	2.50	0.89	1.65	4.50	36.58
9	0.69	0.55	1.50	0.56	0.76	2.00	38.01
10	0.72	0.55	0.50	0.20	0.20	0.50	39.24
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 1
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.38	0.78	67.50	20.01	141.63	314.00	45.10
1	0.83	0.78	67.50	43.70	121.62	246.50	49.34
2	0.70	0.78	57.50	31.40	77.92	179.00	43.53
3	0.55	0.78	45.00	19.31	46.53	121.50	38.29
4	0.57	0.78	35.00	15.56	27.22	76.50	35.58
5	0.31	0.65	20.00	4.03	11.66	41.50	28.10
6	0.55	0.65	11.50	4.11	7.63	21.50	35.49
7	0.51	0.65	5.50	1.82	3.52	10.00	35.18
8	0.63	0.55	2.50	0.86	1.69	4.50	37.67
9	0.74	0.55	1.50	0.60	0.84	2.00	41.83
10	0.85	0.55	0.50	0.23	0.23	0.50	46.33
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: SINGLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.67	0.78	67.50	35.28	145.74	314.00	46.41
1	0.53	0.78	67.50	27.90	110.47	246.50	44.81
2	0.45	0.78	57.50	20.18	82.56	179.00	46.12
3	0.70	0.78	45.00	24.57	62.38	121.50	51.34
4	0.84	0.78	35.00	22.93	37.81	76.50	49.42
5	0.56	0.65	20.00	7.28	14.88	41.50	35.85
6	0.51	0.65	11.50	3.81	7.60	21.50	35.33
7	0.48	0.65	5.50	1.72	3.78	10.00	37.84
8	0.85	0.55	2.50	1.16	2.07	4.50	45.96
9	0.84	0.55	1.50	0.69	0.91	2.00	45.51
10	0.82	0.55	0.50	0.22	0.22	0.50	44.69
TOTAL			314.00				

MIRROR: 20"
CONDITION: NIGHT
SIDE: RIGHT
LEVEL (TR): 2
SING/MULT: MULTIPLE

LANE/DIST	POSITION SCORE	MOTION SCORE	IMPORT. WEIGHT	TOT. WTD. SCORE	CUMUL. SCORE	MAX. POSS. CUM SCORE	% MAX. POS. CUM. SC.
BOTH LANES							
0	0.29	0.78	67.50	15.27	112.79	314.00	35.92
1	0.42	0.78	67.50	22.11	97.52	246.50	39.56
2	0.58	0.78	57.50	26.01	75.41	179.00	42.13
3	0.63	0.78	45.00	22.11	49.40	121.50	40.66
4	0.64	0.78	35.00	17.47	27.28	76.50	35.66
5	0.25	0.65	20.00	3.25	9.81	41.50	23.64
6	0.55	0.65	11.50	4.11	6.56	21.50	30.52
7	0.26	0.65	5.50	0.93	2.45	10.00	24.50
8	0.52	0.55	2.50	0.71	1.52	4.50	33.79
9	0.70	0.55	1.50	0.57	0.81	2.00	40.60
10	0.88	0.55	0.50	0.24	0.24	0.50	47.96
TOTAL			314.00				

Appendix E. Stimulus Slide Presentation Information: Motion/Day-Night

Slide arrangement for all conditions including :
Lane Adjacent Motion Daytime (LAMD)
Lane Far Motion Daytime (LFMD)
Lane Adjacent Motion Nighttime (LAMN)
Lane Far Motion Daytime (LFMN)

Slide Tray Number	Target Position (# car len.) (blank=B)	Slide Tray Number	Target Position (# car len.) (blank=B)
1	B	30	7.0
2	0.0	31	B
3	B	32	7.5
4	0.5	33	B
5	B	34	8.0
6	1.0	35	B
7	B	36	8.5
8	1.5	37	B
9	B	38	9.0
10	2.0	39	B
11	B	40	9.5
12	2.5	41	B
13	B	42	10.0
14	3.0	43	B
15	B	44	10.5
16	3.5	45	B
17	B	46	11.0
18	4.0	47	B
19	B	48	11.5
20	4.5	49	B
21	B	50	12.0
22	5.0	51	B
23	B	52	12.5
24	5.5	53	B
25	B	54	13.0
26	6.0	55	B
27	B	56	13.5
28	6.5	57	B
29	B	58	14.0

Appendix E. Stimulus Slide Presentation Information: Motion/Day-Night

Condition: PRACTICE 1: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 40
Total Trials: 3

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	13	3	F
2	39	9	C
3	25	6	S

Condition: PRACTICE 2: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 45
Total Trials: 3

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	13	3	S
2	25	6	F
3	37	9	C

Condition: PRACTICE 3: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 50
Total Trials: 3

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	25	6	S
2	37	9	F
3	15	3	C

Appendix E. Stimulus Slide Presentation Information: Motion/Day-Night

Condition: DEMO: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 09
Total Trials: 2

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	1	0	F
2	43	10	C

Condition: ACTUAL 1: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 60
Total Trials: 9

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	13	3	F
2	25	6	S
3	25	6	F
4	37	9	F
5	37	9	S
6	39	9	C
7	27	6	C
8	13	3	S
9	15	3	C

Condition: ACTUAL 2: USED FOR ALL CONDITIONS
Slide Tray #: ALL MOTION TRAYS (LAMD, LAMN, LFMD, LFMN)
Sequence #: 65
Total Trials: 9

Trial Number	Slide Tray Number (before start)	Target Position (# car lengths)	Relative Motion (Further=F; Closer=C; Same=S)
1	25	6	S
2	27	6	C
3	15	3	C
4	13	3	S
5	13	3	F
6	25	6	F
7	39	9	C
8	37	9	S
9	37	9	F

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: PRACTICE DAY FOWARD
Slide Tray #: PDF1
Sequence #: 30
Total Trials: 8

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	2	A	S	4
2	4	F	S	8
3	6	A	M	6
4	8	F	M	2
5	10	A	M	10
6	12	F	S	5
7	14	A	S	1
8	16	F	M	3

Condition: PRACTICE DAY BACKWARD
Slide Tray #: PDB1
Sequence #: 35
Total Trials: 8

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M)	White Car Position (# car len.)
1	16	F	M	3
2	14	A	S	1
3	12	F	S	5
4	10	A	M	10
5	8	F	M	2
6	6	A	M	6
7	4	F	S	8
8	2	A	S	4

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: PRACTICE DAY FOWARD
Slide Tray #: PDF2
Sequence #: 20
Total Trials: 32

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	2	F	S	6
2	4	A	S	7
3	6	F	S	1
4	8	F	M	8
5	10	A	M	7
6	12	A	S	9
7	14	F	S	8
8	16	A	S	3
9	18	F	S	7
10	20	F	M	1
11	22	A	M	6
12	24	A	S	4
13	26	F	M	0
14	28	F	M	3
15	30	A	M	10
16	32	F	S	0
17	34	A	S	10
18	36	A	M	0
19	38	F	M	2
20	40	A	S	6
21	42	F	M	10
22	44	F	M	4
23	46	A	M	5
24	48	F	M	7
25	50	F	S	10
26	52	A	M	2
27	54	A	S	5
28	56	F	S	3
29	58	A	M	3
30	60	A	S	1
31	62	A	M	9
32	64	F	S	5

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: PRACTICE DAY BACKWARD
Slide Tray #: PDB2
Sequence #: 25
Total Trials: 32

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	64	F	S	5
2	62	A	M	9
3	60	A	S	1
4	58	A	M	3
5	56	F	S	3
6	54	A	S	5
7	52	A	M	2
8	50	F	S	10
9	48	F	M	7
10	46	A	M	5
11	44	F	M	4
12	42	F	M	10
13	40	A	S	6
14	38	F	M	2
15	36	A	M	0
16	34	A	S	10
17	32	F	S	0
18	30	A	M	10
19	28	F	M	3
20	26	F	M	0
21	24	A	S	4
22	22	A	M	6
23	20	F	M	1
24	18	F	S	7
25	16	A	S	3
26	14	F	S	8
27	12	A	S	9
28	10	A	M	7
29	8	F	M	8
30	6	F	S	1
31	4	A	S	7
32	2	F	S	6

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: PRACTICE DAY FOWARD
Slide Tray #: PDF3
Sequence #: 20
Total Trials: 32

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	2	F	M	9
2	4	F	M	0
3	6	F	S	10
4	8	F	S	3
5	10	A	S	10
6	12	F	S	2
7	14	A	M	4
8	16	A	M	9
9	18	F	S	9
10	20	F	M	1
11	22	F	M	8
12	24	A	S	8
13	26	A	S	2
14	28	A	M	0
15	30	A	M	7
16	32	F	M	4
17	34	A	M	5
18	36	F	S	4
19	38	F	M	6
20	40	A	S	5
21	42	A	S	9
22	44	F	S	6
23	46	F	M	5
24	48	A	M	3
25	50	F	S	0
26	52	A	S	3
27	54	F	M	7
28	56	A	M	2
29	58	A	S	7
30	60	A	S	6
31	62	F	S	1
32	64	A	M	8

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: PRACTICE DAY BACKWARD
Slide Tray #: PDB3
Sequence #: 25
Total Trials: 32

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	64	A	M	8
2	62	F	S	1
3	60	A	S	6
4	58	A	S	7
5	56	A	M	2
6	54	F	M	7
7	52	A	S	3
8	50	F	S	0
9	48	A	M	3
10	46	F	M	5
11	44	F	S	6
12	42	A	S	9
13	40	A	S	5
14	38	F	M	6
15	36	F	S	4
16	34	A	M	5
17	32	F	M	4
18	30	A	M	7
19	28	A	M	0
20	26	A	S	2
21	24	A	S	8
22	22	F	M	8
23	20	F	M	1
24	18	F	S	9
25	16	A	M	9
26	14	A	M	4
27	12	F	S	2
28	10	A	S	10
29	8	F	S	3
30	6	F	S	10
31	4	F	M	0
32	2	F	M	9

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: ACTUAL TEST DAY FOWARD
Slide Tray #: ADF1
Sequence #: 10
Total Trials: 44

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	2	F	M	3
2	4	A	M	6
3	6	F	S	6
4	8	F	S	2
5	10	F	M	2
6	12	A	S	6
7	14	A	M	7
8	16	F	S	1
9	18	F	M	8
10	20	F	S	7
11	22	F	M	0
12	24	A	S	8
13	26	A	S	2
14	28	A	M	2
15	30	F	S	3
16	32	F	M	4
17	34	A	S	0
18	36	A	M	4
19	38	F	S	10
20	40	F	M	7
21	42	A	M	5
22	44	A	M	3
23	46	F	S	6
24	48	A	M	1
25	50	A	S	4
26	52	F	S	0
27	54	F	M	1
28	56	A	S	9
29	58	F	S	4
30	60	F	M	9
31	62	A	S	7
32	64	F	M	10
33	66	A	M	0
34	68	A	M	9
35	70	F	S	5
36	72	A	S	1
37	74	F	M	6
38	76	A	S	5
39	78	F	M	5
40	80	A	S	10
41	82	A	M	10
42	84	A	S	3
43	86	A	M	8
44	88	F	S	8

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: ACTUAL TEST DAY BACKWARD
Slide Tray #: ADB1
Sequence #: 15
Total Trials: 44

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	88	F	S	8
2	86	A	M	8
3	84	A	S	3
4	82	A	M	10
5	80	A	S	10
6	78	F	M	5
7	76	A	S	5
8	74	F	M	6
9	72	A	S	1
10	70	F	S	5
11	68	A	M	9
12	66	A	M	0
13	64	F	M	10
14	62	A	S	7
15	60	F	M	9
16	58	F	S	4
17	56	A	S	9
18	54	F	M	1
19	52	F	S	0
20	50	A	S	4
21	48	A	M	1
22	46	F	S	6
23	44	A	M	3
24	42	A	M	5
25	40	F	M	7
26	38	F	S	10
27	36	A	M	4
28	34	A	S	0
29	32	F	M	4
30	30	F	S	3
31	28	A	M	2
32	26	A	S	2
33	24	A	S	8
34	22	F	M	0
35	20	F	S	7
36	18	F	M	8
37	16	F	S	1
38	14	A	M	7
39	12	A	S	6
40	10	F	M	2
41	8	F	S	2
42	6	F	S	6
43	4	A	M	6
44	2	F	M	3

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: ACTUAL TEST DAY FOWARD
Slide Tray #: ADF2
Sequence #: 10
Total Trials: 44

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	2	A	M	10
2	4	F	S	2
3	6	F	M	9
4	8	A	S	9
5	10	A	S	4
6	12	A	M	3
7	14	A	M	7
8	16	A	S	1
9	18	F	S	10
10	20	F	S	9
11	22	F	M	3
12	24	F	S	0
13	26	F	M	4
14	28	A	S	3
15	30	F	S	7
16	32	A	S	0
17	34	A	S	6
18	36	F	S	4
19	38	F	S	6
20	40	A	M	0
21	42	F	M	5
22	44	A	S	2
23	46	A	M	6
24	48	F	M	10
25	50	A	M	2
26	52	F	M	7
27	54	A	S	7
28	56	A	M	8
29	58	A	S	10
30	60	A	M	5
31	62	F	M	0
32	64	F	S	3
33	66	F	M	8
34	68	F	M	1
35	70	A	S	5
36	72	F	S	1
37	74	F	S	8
38	76	F	S	5
39	78	A	S	8
40	80	F	M	6
41	82	A	M	9
42	84	A	M	1
43	86	F	M	2
44	88	A	M	4

Appendix F. Stimulus Slide Presentation Information: Position/Day

Condition: ACTUAL TEST DAY BACKWARD
Slide Tray #: ADB2
Sequence #: 15
Total Trials: 44

Trial Number	Slide Tray Number	Adjacent (A) or Far (F) Lane	Single (S) or Multiple (M) Target	White Car Position (# car len.)
1	88	A	M	4
2	86	F	M	2
3	84	A	M	1
4	82	A	M	9
5	80	F	M	6
6	78	A	S	8
7	76	F	S	5
8	74	F	S	8
9	72	F	S	1
10	70	A	S	5
11	68	F	M	1
12	66	F	M	8
13	64	F	S	3
14	62	F	M	0
15	60	A	M	5
16	58	A	S	10
17	56	A	M	8
18	54	A	S	7
19	52	F	M	7
20	50	A	M	2
21	48	F	M	10
22	46	A	M	6
23	44	A	S	2
24	42	F	M	5
25	40	A	M	0
26	38	F	S	6
27	36	F	S	4
28	34	A	S	6
29	32	A	S	0
30	30	F	S	7
31	28	A	S	3
32	26	F	M	4
33	24	F	S	0
34	22	F	M	3
35	20	F	S	9
36	18	F	S	10
37	16	A	S	1
38	14	A	M	7
39	12	A	M	3
40	10	A	S	4
41	8	A	S	9
42	6	F	M	9
43	4	F	S	2
44	2	A	M	10

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: PRACTICE NIGHT FOWARD
Slide Tray #: PNF1
Sequence #: 30
Total Trials: 8

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	2	S	3
2	4	S	10
3	6	M	3
4	8	M	7
5	10	M	1
6	12	S	8
7	14	S	4
8	16	M	6

Condition: PRACTICE NIGHT BACKWARD
Slide Tray #: PNB1
Sequence #: 35
Total Trials: 8

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	16	M	6
2	14	S	4
3	12	S	8
4	10	M	1
5	8	M	7
6	6	M	3
7	4	S	10
8	2	S	3

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: PRACTICE NIGHT FOWARD
Slide Tray #: PNF2
Sequence #: 20
Total Trials: 32

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	2	M	8
2	4	M	0
3	6	M	4
4	8	S	8
5	10	S	4
6	12	M	8
7	14	M	3
8	16	M	10
9	18	S	3
10	20	S	10
11	22	M	2
12	24	S	9
13	26	M	2
14	28	M	4
15	30	S	9
16	32	S	0
17	34	M	6
18	36	S	0
19	38	M	5
20	40	S	7
21	42	S	1
22	44	S	2
23	46	M	8
24	48	S	6
25	50	S	2
26	52	S	5
27	54	M	0
28	56	S	1
29	58	M	8
30	60	M	4
31	62	S	6
32	64	M	0

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: PRACTICE NIGHT BACKWARD
Slide Tray #: PNB2
Sequence #: 25
Total Trials: 32

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	64	M	0
2	62	S	6
3	60	M	4
4	58	M	8
5	56	S	1
6	54	M	0
7	52	S	5
8	50	S	2
9	48	S	6
10	46	M	8
11	44	S	2
12	42	S	1
13	40	S	7
14	38	M	5
15	36	S	0
16	34	M	6
17	32	S	0
18	30	S	9
19	28	M	4
20	26	M	2
21	24	S	9
22	22	M	2
23	20	S	10
24	18	S	3
25	16	M	10
26	14	M	3
27	12	M	8
28	10	S	4
29	8	S	8
30	6	M	4
31	4	M	0
32	2	M	8

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: PRACTICE NIGHT FOWARD
Slide Tray #: PNF3
Sequence #: 20
Total Trials: 32

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	2	S	8
2	4	S	0
3	6	S	3
4	8	M	6
5	10	M	7
6	12	S	0
7	14	M	8
8	16	M	6
9	18	S	5
10	20	S	2
11	22	S	5
12	24	S	1
13	26	M	5
14	28	M	6
15	30	M	0
16	32	M	2
17	34	S	10
18	36	S	6
19	38	M	1
20	40	M	3
21	42	S	9
22	44	S	7
23	46	S	4
24	48	M	10
25	50	S	3
26	52	M	8
27	54	M	3
28	56	S	8
29	58	M	0
30	60	M	4
31	62	S	4
32	64	S	10

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: PRACTICE NIGHT BACKWARD
Slide Tray #: PNB3
Sequence #: 25
Total Trials: 32

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	64	S	10
2	62	S	4
3	60	M	4
4	58	M	0
5	56	S	8
6	54	M	3
7	52	M	8
8	50	S	3
9	48	M	10
10	46	S	4
11	44	S	7
12	42	S	9
13	40	M	3
14	38	M	1
15	36	S	6
16	34	S	10
17	32	M	2
18	30	M	0
19	28	M	6
20	26	M	5
21	24	S	1
22	22	S	5
23	20	S	2
24	18	S	5
25	16	M	6
26	14	M	8
27	12	S	0
28	10	M	7
29	8	M	6
30	6	S	3
31	4	S	0
32	2	S	8

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: ACTUAL TEST NIGHT FOWARD
Slide Tray #: ANF1
Sequence #: 10
Total Trials: 44

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	2	M	3
2	4	M	6
3	6	S	6
4	8	S	2
5	10	M	2
6	12	S	6
7	14	M	6
8	16	S	1
9	18	M	8
10	20	S	7
11	22	M	0
12	24	S	8
13	26	S	2
14	28	M	2
15	30	S	3
16	32	M	4
17	34	S	0
18	36	M	4
19	38	S	10
20	40	M	7
21	42	M	4
22	44	M	3
23	46	S	6
24	48	M	0
25	50	S	4
26	52	S	0
27	54	M	1
28	56	S	9
29	58	S	4
30	60	M	8
31	62	S	7
32	64	M	8
33	66	M	0
34	68	M	8
35	70	S	5
36	72	S	1
37	74	M	6
38	76	S	5
39	78	M	5
40	80	S	10
41	82	M	10
42	84	S	3
43	86	M	6
44	88	S	8

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: ACTUAL TEST NIGHT BACKWARD
Slide Tray #: ANB1
Sequence #: 15
Total Trials: 44

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	88	S	8
2	86	M	6
3	84	S	3
4	82	M	10
5	80	S	10
6	78	M	5
7	76	S	5
8	74	M	6
9	72	S	1
10	70	S	5
11	68	M	8
12	66	M	0
13	64	M	8
14	62	S	7
15	60	M	8
16	58	S	4
17	56	S	9
18	54	M	1
19	52	S	0
20	50	S	4
21	48	M	0
22	46	S	6
23	44	M	3
24	42	M	4
25	40	M	7
26	38	S	10
27	36	M	4
28	34	S	0
29	32	M	4
30	30	S	3
31	28	M	2
32	26	S	2
33	24	S	8
34	22	M	0
35	20	S	7
36	18	M	8
37	16	S	1
38	14	M	6
39	12	S	6
40	10	M	2
41	8	S	2
42	6	S	6
43	4	M	6
44	2	M	3

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: ACTUAL TEST NIGHT FOWARD
Slide Tray #: ANF2
Sequence #: 10
Total Trials: 44

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	2	M	10
2	4	S	2
3	6	M	8
4	8	S	9
5	10	S	4
6	12	M	3
7	14	M	6
8	16	S	1
9	18	S	10
10	20	S	9
11	22	M	3
12	24	S	0
13	26	M	4
14	28	S	3
15	30	S	7
16	32	S	0
17	34	S	6
18	36	S	4
19	38	S	6
20	40	M	0
21	42	M	5
22	44	S	2
23	46	M	6
24	48	M	8
25	50	M	2
26	52	M	7
27	54	S	7
28	56	M	6
29	58	S	10
30	60	M	4
31	62	M	0
32	64	S	3
33	66	M	8
34	68	M	1
35	70	S	5
36	72	S	1
37	74	S	8
38	76	S	5
39	78	S	8
40	80	M	6
41	82	M	8
42	84	M	0
43	86	M	2
44	88	M	4

Appendix G. Stimulus Slide Presentation Information: Position/Night

Condition: ACTUAL TEST NIGHT BACKWARD
Slide Tray #: ANB2
Sequence #: 15
Total Trials: 44

Trial Number	Slide Tray Number	Single (S) or Multiple (M)	Closest Car Position (# car lengths)
1	88	M	4
2	86	M	2
3	84	M	0
4	82	M	8
5	80	M	6
6	78	S	8
7	76	S	5
8	74	S	8
9	72	S	1
10	70	S	5
11	68	M	1
12	66	M	8
13	64	S	3
14	62	M	0
15	60	M	4
16	58	S	10
17	56	M	6
18	54	S	7
19	52	M	7
20	50	M	2
21	48	M	8
22	46	M	6
23	44	S	2
24	42	M	5
25	40	M	0
26	38	S	6
27	36	S	4
28	34	S	6
29	32	S	0
30	30	S	7
31	28	S	3
32	26	M	4
33	24	S	0
34	22	M	3
35	20	S	9
36	18	S	10
37	16	S	1
38	14	M	6
39	12	M	3
40	10	S	4
41	8	S	9
42	6	M	8
43	4	S	2
44	2	M	10

APPENDIX H
RAIN SIMULATION

SIMULATION OF RAIN

The following describes a primitive yet useful inexpensive method for simulating rainfall on an exterior mirror and side window/windshield through which it is viewed by an observer in the simulation.

Equipment

1. Commerically available mister. Model; Raindrip (3 gal/hr).
2. Submersible pump (500 gal per hour). Model; Calpump 500.
3. Mounting hardware, plastic tubing and catch basin.

Set-up

The pump, hoses and mister are installed below (about 18 inches) and outboard (about 12 inches) of the mirror and 34 inches diagonally from the mirror surface. The pump/mister delivers 1.8 gallons per hour and encompasses a 26 inch diameter circle (approximate) at 34 inch distance.

Prior to testing water should be sprayed onto the mirror for 2-3 minutes to obtain a build-up of water droplets on the surfaces. Spray is directed at the inner edge of the mirror such that it encompasses the mirror and plexiglass side window cover.

APPENDIX I
Simulated-Use Apparatus Set-Up

1 OVERVIEW

This section describes the stimulus presentation apparatus. A block diagram of the equipment is shown in Figure 1. An Apple IIe computer is used to control the sequence of slide presentations, to provide control signals to the slide projector and to record subject responses. The DI09 I/O Interface Board mounts in the Apple computer and provides digital input/output capability. The UI16 Power Isolation Board contains OPTO 22 output modules for driving the projector functions and input modules for sensing projector conditions and subject responses. A small circuit board contains a circuit that "or"s all response lines.

The slide projector is a Kodak Ektagraphic Model III AM. This projector has provisions for remote control of lamp on/off and slide advance/reverse and has switch sensors for slide tray zero position and shutter open conditions.

The response unit is a metal box that contains the four response switches.

Power to the control circuits is provided by a 12 VDC power supply (not provided).

The UI16 Power Isolation Unit, the "or" circuit board and other control components are contained on a single 19 inch rack panel (the "control panel") that is mounted on a desk-top rack. The DI09 I/O Interface board is inserted into the Apple IIe bus. The Apple IIe computer, slide projector, response unit and 12 VDC power supply are positioned independently.

Figure 2 is a wiring diagram for the DI09 Power Isolation Unit and other components mounted on the control panel. Included are the color codes for the cabling connections between the projector and response unit cables and the terminal blocks on the control panel. The system is shipped with the response unit and projector interface cables pre-connected to the control unit.

Figure 3 is a wiring diagram for the DI09/Response Unit "OR" Interface Board.

Figure 4 is a wiring diagram for the response unit.

Figure 5 shows the orientation of the DI09 I/O board in the Apple computer with its cables attached.

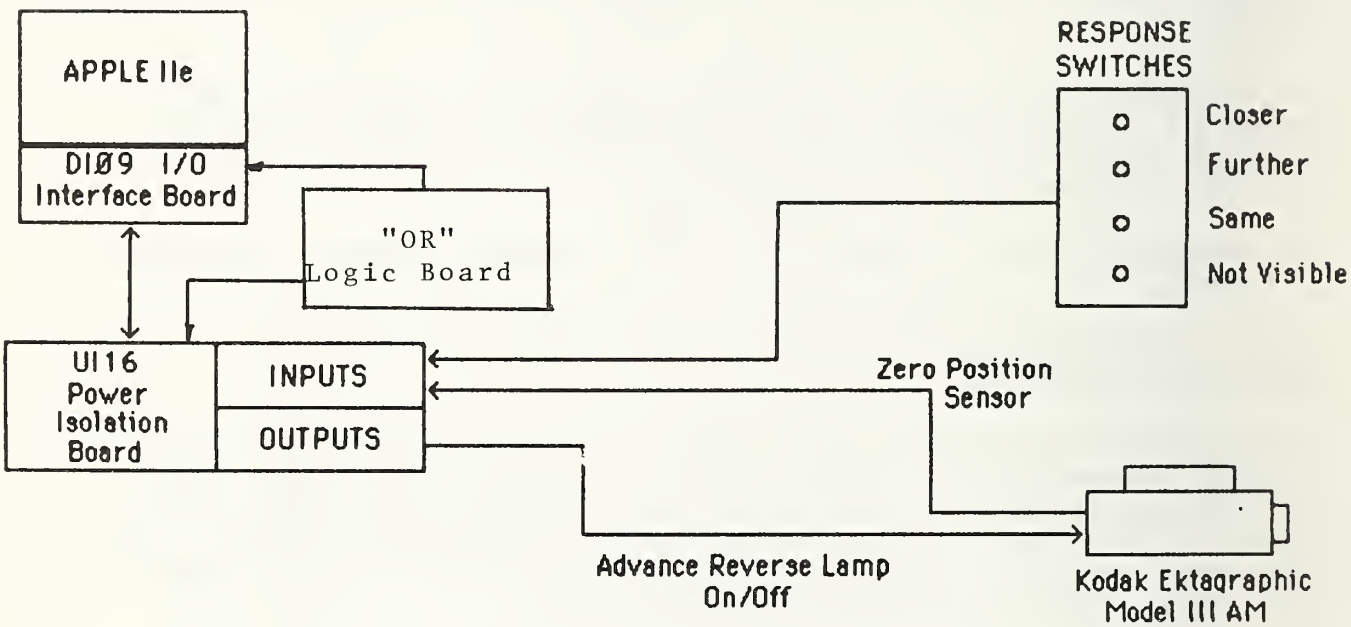
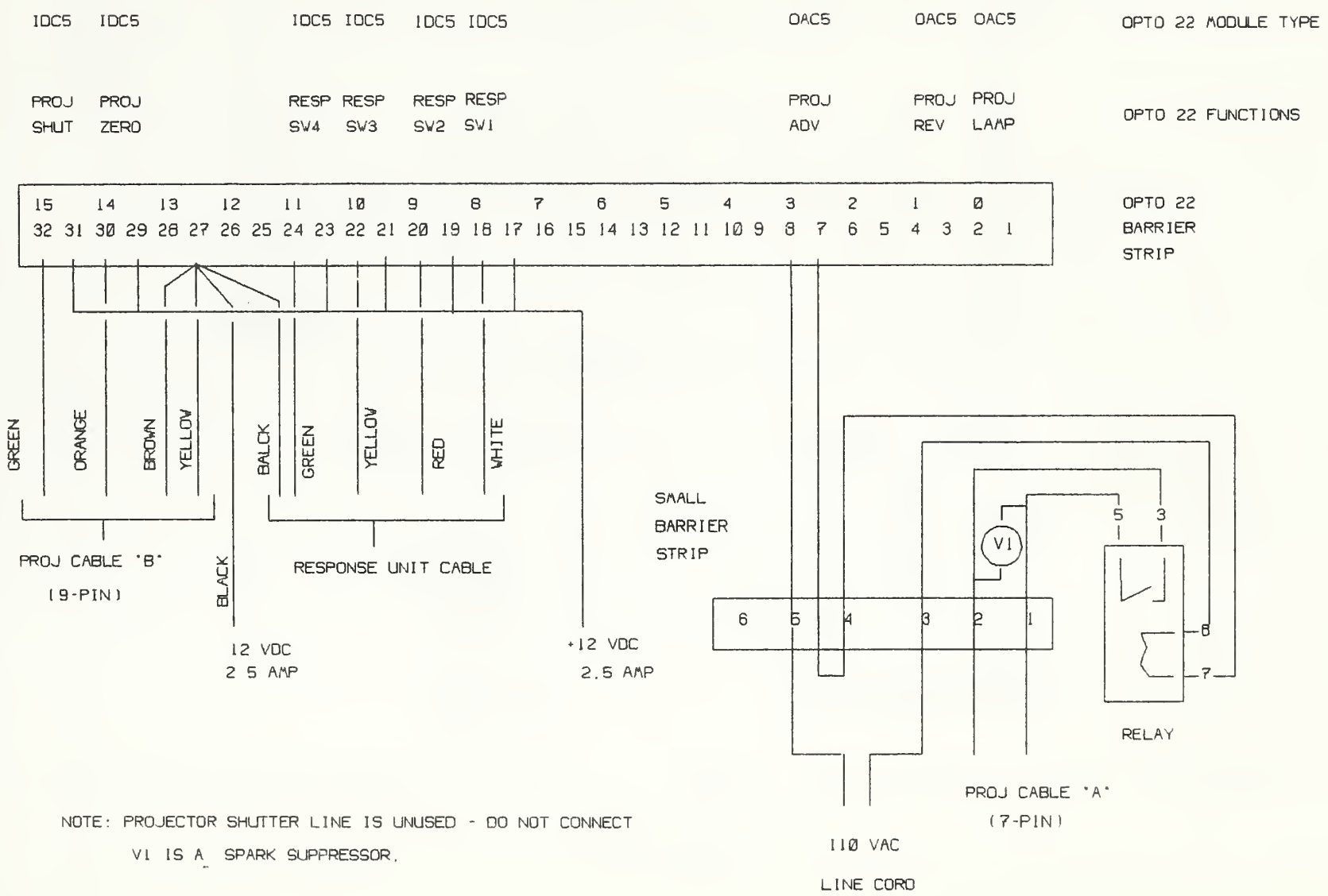


FIGURE 1. MIRROR TESTING COMPUTER SYSTEM BLOCK DIAGRAM

FIGURE 2
CONTROL PANEL/PROJECTOR INTERFACE

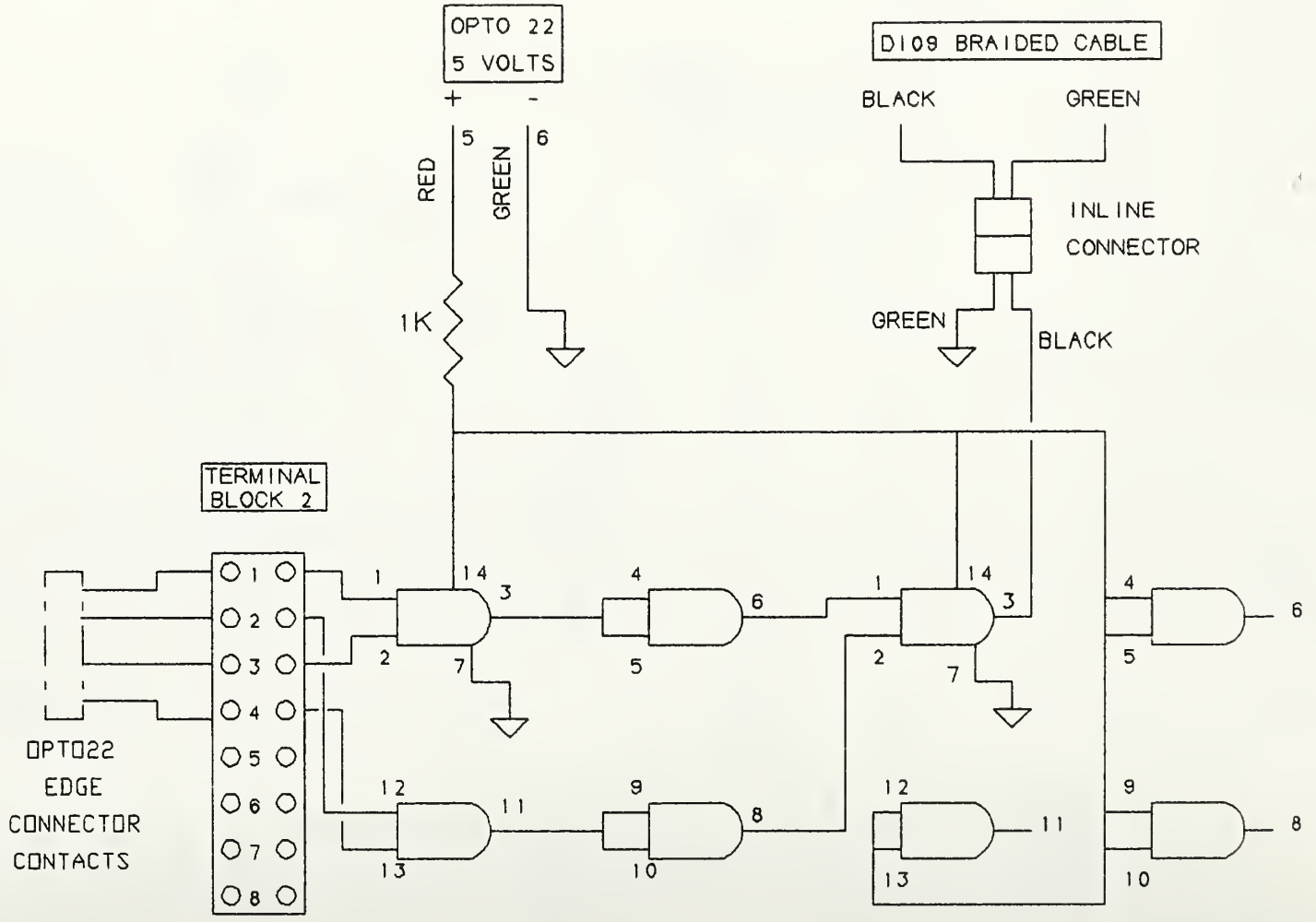


NOTE: PROJECTOR SHUTTER LINE IS UNUSED - DO NOT CONNECT

V1 IS A SPARK SUPPRESSOR.

FIGURE 3

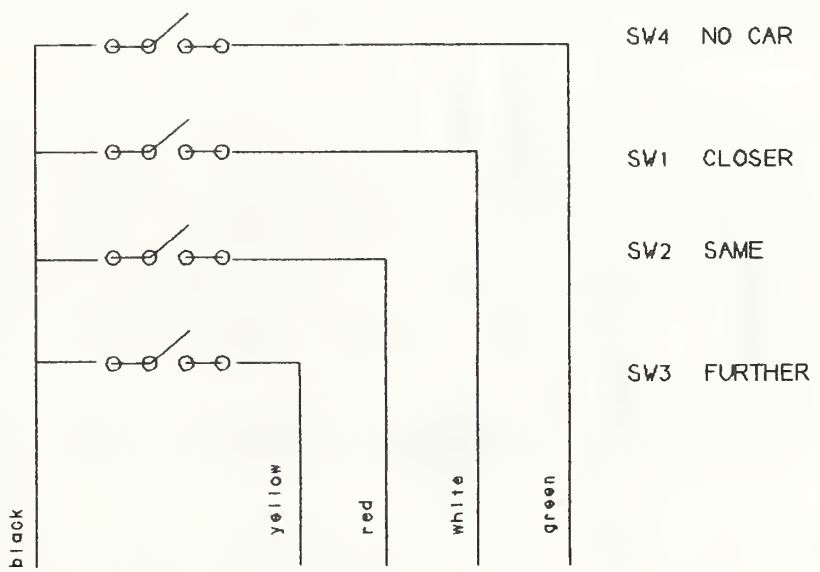
D109/RESPONSE UNIT "OR" INTERFACE BOARD



NOTE: THIS UNIT "ORS" ALL FOUR RESPONSE SWITCHES

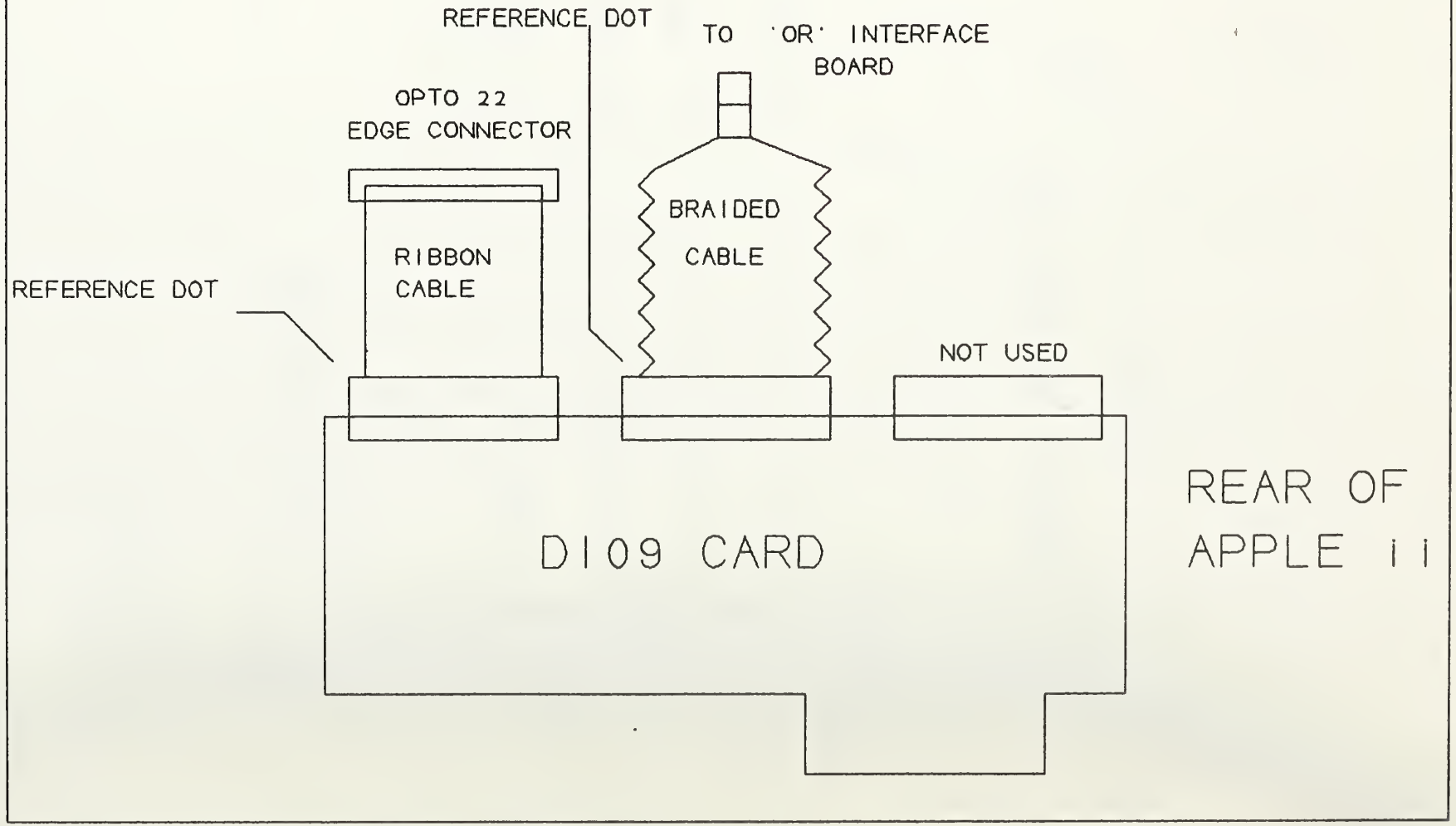
FIGURE 4

SUBJECT RESPONSE UNIT



CABLE TO CONTROL PANEL

FIGURE 5
D109 CABLE CONNECTIONS



2 SHIPPING

The units are shipped as follows:

2.1 DI09 and UI16 boards in a separate shipping container.

2.2 The desk-top rack cabinet with the attached control panel, including the "or" circuit board in a separate shipping container. The projector cables are shipped attached to the control panel. The response unit and its cable are shipped attached to the control panel.

2.3 The slide projector in a separate shipping container.

2.4 Original manuals for the DI09, UI16 and Ektagraphic projector are also supplied.

3 SET-UP AND CABLING

3.1 Set up the desk-top rack with the attached control panel.

3.2 Provide a 12 VDC regulated power supply with at least 2.5 A capacity. A marked cable is attached to the control panel terminal strip (see Figure 2) for connection to the power supply. (Note that the "-12VDC" legend in Figure 2 indicates the ground reference for the 12 VDC supply.)

3.3 Two cables run from the slide projector to the control panel, indicated as A and B in Figure 2. These cables can be easily distinguished by the connectors on the projector end, one being a nine-pin and the other a seven-pin connector. The connections at the control panel are via terminal lugs which are connected to terminal blocks as per Figure 2. The system is shipped with these cables connected to the terminal blocks. Simply connect the connector end of these cables to the slide projector.

3.4 A single cable runs from the response unit to the control panel. This cable is terminated at the control panel with terminal lugs as indicated in Figure 2 and is shipped connected at both ends.

3.5 The DI09 board must be mounted in an Apple IIe computer as per manufacturer's instructions (see also Figure 5).

Two cables run from the DI09 board to the control panel: (1) a ribbon cable that connects to an edge connector on the OPTO 22 board, and (2) a braided cable of which only two lines are used that are terminated in an in-line connector. This connector mates with a similar connector cabled to the "or" board. Do not add to the length of these cables.

4 MAINTENANCE

Except for the relay mounted on the control panel which drives the projector lamp, all components are solid state and do not require periodic maintenance. The relay contacts should be checked visually periodically for signs of contact pitting. Note that V1 (Figure 2) is a contact spark suppressor.

Appendix J. Computer Program

```
JLIST

100  REM  ********************
101  REM  PROJ01
102  REM  MODIFIED 1/29/86
103  REM  MODIFIED 6/20/86
104  REM  RESPONSE TEST IN TIMING
      LOOP
105  REM  0.4 SEC DELAY AFTER RES
     PONSE
106  REM    TO SOLVE MISS OF SLID
     E MOVE
107  REM  ************************

110  REM  MAIN PROGRAM
120  REM
130  REM
140  GOSUB 8000
150  GOSUB 8400
160 TX = 4
170 DX = 8
180 MX = 111
500  REM
510  DIM CD(200),VA(200)
520  DIM TR(200),SL(200),RS(200)
530  DIM RC(100)
532  DIM SP(200)
533  DIM CR(200)
1100  REM
1110  INPUT "TOT NO. OF SEQ TO RU
     N:";NS
1120  FOR SC = 1 TO NS
1130  GOSUB 3000
1140  GOSUB 3400
1150  NEXT SC
1170  REM
1171  DATA  "SQ10","NS90"
1172  DATA  "TM20"
1173  DATA  "GT01"
1174  DATA  "AD01"
1175  DATA  "GT03"
1176  DATA  "AD01"
1177  DATA  "GT05"
1178  DATA  "AD01"
1179  DATA  "GT07"
1180  DATA  "AD01"
1181  DATA  "GT09"
1182  DATA  "AD01"
1183  DATA  "GT11"
1184  DATA  "AD01"
1185  DATA  "GT13"
1186  DATA  "AD01"
1187  DATA  "GT15"
1188  DATA  "AD01"
1189  DATA  "GT17"
1190  DATA  "AD01"
1191  DATA  "GT19"
1192  DATA  "AD01"
1193  DATA  "GT21"
1194  DATA  "AD01"
1195  DATA  "GT23"
1200  DATA  "AD01"
1205  DATA  "GT25"
1210  DATA  "AD01"
1240  DATA  "GT27"
1245  DATA  "AD01"
1250  DATA  "GT29"
1255  DATA  "AD01"
1260  DATA  "GT31"
1265  DATA  "AD01"
1270  DATA  "GT33"
1275  DATA  "AD01"
1280  DATA  "GT35"
1285  DATA  "AD01"
1290  DATA  "GT37"
1295  DATA  "AD01"
1300  DATA  "GT39"
1305  DATA  "AD01"
1310  DATA  "GT41"
1315  DATA  "AD01"
1320  DATA  "GT43"
1325  DATA  "AD01"
1330  DATA  "GT45"
1335  DATA  "AD01"
1340  DATA  "GT47"
1345  DATA  "AD01"
1350  DATA  "GT49"
1355  DATA  "AD01"
1360  DATA  "GT51"
1365  DATA  "AD01"
1370  DATA  "GT53"
1375  DATA  "AD01"
1380  DATA  "GT55"
1385  DATA  "AD01"
1390  DATA  "GT57"
1400  DATA  "AD01"
1405  DATA  "GT59"
1410  DATA  "AD01"
1415  DATA  "GT61"
1420  DATA  "AD01"
1425  DATA  "GT63"
1430  DATA  "AD01"
1435  DATA  "GT65"
1440  DATA  "AD01"
1445  DATA  "GT67"
1450  DATA  "AD01"
1455  DATA  "GT69"
1460  DATA  "AD01"
1465  DATA  "GT71"
1470  DATA  "AD01"
1475  DATA  "GT73"
1480  DATA  "AD01"
1485  DATA  "GT75"
1490  DATA  "AD01"
1495  DATA  "GT77"
1500  DATA  "AD01"
1505  DATA  "GT79"
1510  DATA  "AD01"
1515  DATA  "GT81"
1520  DATA  "AD01"
1525  DATA  "GT83"
1530  DATA  "AD01"
1535  DATA  "GT85"
1540  DATA  "AD01"
1545  DATA  "GT87"
1550  DATA  "AD01"
1555  DATA  "GT89"
```

```
1556  DATA  "GT00"
1560  DATA  "S015","NS88"
1561  DATA  "TM20"
1565  DATA  "GT89"
1570  DATA  "RV01"
1575  DATA  "GT87"
1580  DATA  "RV01"
1585  DATA  "GT85"
1590  DATA  "RV01"
1600  DATA  "GT83"
1605  DATA  "RV01"
1610  DATA  "GT81"
1615  DATA  "RV01"
1625  DATA  "GT79"
1630  DATA  "RV01"
1635  DATA  "GT77"
1640  DATA  "RV01"
1645  DATA  "GT75"
1650  DATA  "RV01"
1655  DATA  "GT73"
1660  DATA  "RV01"
1665  DATA  "GT71"
1670  DATA  "RV01"
1675  DATA  "GT69"
1680  DATA  "RV01"
1685  DATA  "GT67"
1690  DATA  "RV01"
1695  DATA  "GT65"
1700  DATA  "RV01"
1705  DATA  "GT63"
1710  DATA  "RV01"
1715  DATA  "GT61"
1720  DATA  "RV01"
1725  DATA  "GT59"
1730  DATA  "RV01"
1735  DATA  "GT57"
1740  DATA  "RV01"
1745  DATA  "GT55"
1750  DATA  "RV01"
1755  DATA  "GT53"
1760  DATA  "RV01"
1765  DATA  "GT51"
1770  DATA  "RV01"
1775  DATA  "GT49"
1780  DATA  "RV01"
1785  DATA  "GT47"
1790  DATA  "RV01"
1795  DATA  "GT45"
1800  DATA  "RV01"
1805  DATA  "GT43"
1810  DATA  "RV01"
1815  DATA  "GT41"
1820  DATA  "RV01"
1825  DATA  "GT39"
1830  DATA  "RV01"
1835  DATA  "GT37"
1840  DATA  "RV01"
1845  DATA  "GT35"
1850  DATA  "RV01"
1855  DATA  "GT33"
1860  DATA  "RV01"
1865  DATA  "GT31"
1870  DATA  "RV01"
1875  DATA  "GT29"
1880  DATA  "RV01"
1885  DATA  "GT27"
1890  DATA  "RV01"
1895  DATA  "GT25"
1900  DATA  "RV01"
1905  DATA  "GT23"
1910  DATA  "RV01"
1915  DATA  "GT21"
1920  DATA  "RV01"
1925  DATA  "GT19"
1930  DATA  "RV01"
1935  DATA  "GT17"
1940  DATA  "RV01"
1945  DATA  "GT15"
1950  DATA  "RV01"
1955  DATA  "GT13"
1960  DATA  "RV01"
1965  DATA  "GT11"
1970  DATA  "RV01"
1975  DATA  "GT09"
1980  DATA  "RV01"
1985  DATA  "GT07"
1990  DATA  "RV01"
1995  DATA  "GT05"
2000  DATA  "RV01"
2005  DATA  "GT03"
2010  DATA  "RV01"
2020  DATA  "S030","NS18"
2025  DATA  "TM30"
2030  DATA  "GT01"
2035  DATA  "AD01"
2040  DATA  "GT03"
2045  DATA  "AD01"
2050  DATA  "GT05"
2055  DATA  "AD01"
2060  DATA  "GT07"
2065  DATA  "AD01"
2070  DATA  "GT09"
2075  DATA  "AD01"
2080  DATA  "GT11"
2085  DATA  "AD01"
2090  DATA  "GT13"
2091  DATA  "AD01"
2092  DATA  "GT15"
2093  DATA  "AD01"
2094  DATA  "GT17"
2095  DATA  "GT00"
2098  DATA  "TM30"
2099  DATA  "S035","NS16"
2100  DATA  "TM30"
2101  DATA  "GT17"
2102  DATA  "RV01"
2103  DATA  "GT15"
2104  DATA  "RV01"
2105  DATA  "GT13"
2106  DATA  "RV01"
2107  DATA  "GT11"
2108  DATA  "RV01"
2109  DATA  "GT09"
2110  DATA  "RV01"
2111  DATA  "GT07"
2112  DATA  "RV01"
2113  DATA  "GT05"
2114  DATA  "RV01"
2115  DATA  "GT03"
2116  DATA  "RV01"
2120  DATA  "S025","NS65"
2121  DATA  "TM30"
```

```
2122  DATA  "GT65"
2123  DATA  "RV01"
2124  DATA  "GT63"
2125  DATA  "RV01"
2126  DATA  "GT61"
2127  DATA  "RV01"
2128  DATA  "GT59"
2129  DATA  "RV01"
2130  DATA  "GT57"
2132  DATA  "RV01"
2134  DATA  "GT55"
2136  DATA  "RV01"
2138  DATA  "GT53"
2140  DATA  "RV01"
2142  DATA  "GT51"
2144  DATA  "RV01"
2146  DATA  "GT49"
2148  DATA  "RV01"
2150  DATA  "GT47"
2152  DATA  "RV01"
2154  DATA  "GT45"
2156  DATA  "RV01"
2158  DATA  "GT43"
2160  DATA  "RV01"
2162  DATA  "GT41"
2164  DATA  "RV01"
2166  DATA  "GT39"
2168  DATA  "RV01"
2170  DATA  "GT37"
2172  DATA  "RV01"
2174  DATA  "GT35"
2176  DATA  "RV01"
2178  DATA  "GT33"
2180  DATA  "RV01"
2182  DATA  "GT31"
2184  DATA  "RV01"
2186  DATA  "GT29"
2188  DATA  "RV01"
2190  DATA  "GT27"
2192  DATA  "RV01"
2194  DATA  "GT25"
2196  DATA  "RV01"
2198  DATA  "GT23"
2200  DATA  "RV01"
2202  DATA  "GT21"
2204  DATA  "RV01"
2206  DATA  "GT19"
2208  DATA  "RV01"
2210  DATA  "GT17"
2212  DATA  "RV01"
2214  DATA  "GT15"
2216  DATA  "RV01"
2218  DATA  "GT13"
2220  DATA  "RV01"
2222  DATA  "GT11"
2224  DATA  "RV01"
2226  DATA  "GT09"
2228  DATA  "RV01"
2230  DATA  "GT07"
2232  DATA  "RV01"
2234  DATA  "GT05"
2236  DATA  "RV01"
2240  DATA  "GT03"
2242  DATA  "RV01"
2244  DATA  "GT00"
2499  DATA  "S020","NS66"
```

```
2500  DATA  "TM30"
2501  DATA  "GT01"
2502  DATA  "AD01"
2503  DATA  "GT03"
2504  DATA  "AD01"
2505  DATA  "GT05"
2506  DATA  "AD01"
2507  DATA  "GT07"
2508  DATA  "AD01"
2509  DATA  "GT09"
2510  DATA  "AD01"
2511  DATA  "GT11"
2512  DATA  "AD01"
2513  DATA  "GT13"
2514  DATA  "AD01"
2515  DATA  "GT15"
2516  DATA  "AD01"
2517  DATA  "GT17"
2518  DATA  "AD01"
2519  DATA  "GT19"
2520  DATA  "AD01"
2521  DATA  "GT21"
2522  DATA  "AD01"
2523  DATA  "GT23"
2524  DATA  "AD01"
2525  DATA  "GT25"
2526  DATA  "AD01"
2527  DATA  "GT27"
2528  DATA  "AD01"
2529  DATA  "GT29"
2530  DATA  "AD01"
2531  DATA  "GT31"
2532  DATA  "AD01"
2533  DATA  "GT33"
2534  DATA  "AD01"
2535  DATA  "GT35"
2536  DATA  "AD01"
2537  DATA  "GT37"
2538  DATA  "AD01"
2539  DATA  "GT39"
2540  DATA  "AD01"
2541  DATA  "GT41"
2542  DATA  "AD01"
2543  DATA  "GT43"
2544  DATA  "AD01"
2545  DATA  "GT45"
2546  DATA  "AD01"
2600  DATA  "GT47"
2601  DATA  "AD01"
2602  DATA  "GT49"
2603  DATA  "AD01"
2604  DATA  "GT51"
2605  DATA  "AD01"
2606  DATA  "GT53"
2607  DATA  "AD01"
2608  DATA  "GT55"
2609  DATA  "AD01"
2610  DATA  "GT57"
2611  DATA  "AD01"
2612  DATA  "GT59"
2613  DATA  "AD01"
2614  DATA  "GT61"
2615  DATA  "AD01"
2616  DATA  "GT63"
2617  DATA  "AD01"
2618  DATA  "GT65"
```

```
2620  DATA  "GT00"
2750  DATA  "S040","NS07"
2751  DATA  "TM20"
2752  DATA  "GT13"
2753  DATA  "AD17"
2754  DATA  "GT39"
2755  DATA  "RV17"
2756  DATA  "GT25"
2757  DATA  "PT11"
2760  DATA  "GT00"
2765  DATA  "S045","NS07"
2770  DATA  "TM20"
2771  DATA  "GT13"
2772  DATA  "PT11"
2773  DATA  "GT25"
2774  DATA  "AD17"
2775  DATA  "GT37"
2776  DATA  "RV17"
2778  DATA  "GT00"
2785  DATA  "S050","NS07"
2790  DATA  "TM20"
2791  DATA  "GT25"
2792  DATA  "PT07"
2793  DATA  "GT37"
2794  DATA  "AD13"
2795  DATA  "GT15"
2796  DATA  "RV13"
2797  DATA  "GT00"
2800  DATA  "S060","NS19"
2802  DATA  "TM20"
2803  DATA  "GT13"
2804  DATA  "AD17"
2805  DATA  "GT25"
2806  DATA  "PT11"
2807  DATA  "GT25"
2808  DATA  "AD17"
2809  DATA  "GT37"
2810  DATA  "AD17"
2811  DATA  "GT37"
2812  DATA  "PT11"
2814  DATA  "GT39"
2815  DATA  "RV17"
2816  DATA  "GT27"
2817  DATA  "RV17"
2818  DATA  "GT13"
2819  DATA  "PT11"
2820  DATA  "GT15"
2822  DATA  "RV17"
2823  DATA  "GT00"
2830  DATA  "S065","NS19"
2832  DATA  "TM20"
2834  DATA  "GT25"
2836  DATA  "PT11"
2838  DATA  "GT27"
2840  DATA  "RV17"
2842  DATA  "GT15"
2844  DATA  "RV17"
2846  DATA  "GT13"
2848  DATA  "PT11"
2850  DATA  "GT13"
2852  DATA  "AD17"
2854  DATA  "GT25"
2856  DATA  "AD17"
2858  DATA  "GT39"
2860  DATA  "RV17"
2862  DATA  "GT37"
2864  DATA  "PT11"
2866  DATA  "GT37"
2868  DATA  "AD17"
2870  DATA  "GT00"
2875  DATA  "S009","NS04"
2876  DATA  "TM20"
2878  DATA  "GT01"
2880  DATA  "AD42"
2882  DATA  "GT43"
2884  DATA  "RV43"
2990  END
3000  REM  READ-SEQ
3010  REM
3020  HOME
3030  INPUT "ENTER SEQ NO. TO RUN
      (##):";NS$
3040  RESTORE
3050  READ IN$
3060  IF  LEFT$ (IN$,2) = "SQ" AND
      RIGHT$ (IN$,2) = NS$ THEN  GOTO
      3080
3070  GOTO 3050
3080  READ IN$
3090 NC =  VAL ( RIGHT$ (IN$,2))
3100  READ IN$
3110 TM =  VAL ( RIGHT$ (IN$,2))
3120  FOR II = 1 TO NC
3130  READ IN$
3140  IF  LEFT$ (IN$,2) = "GT" THEN
      CD(II) = 2
3150  IF  LEFT$ (IN$,2) = "AD" THEN
      CD(II) = 1
3160  IF  LEFT$ (IN$,2) = "RV" THEN
      CD(II) =  - 1
3170  IF  LEFT$ (IN$,2) = "PT" THEN
      CD(II) = 0
3180 VA(II) =  VAL ( RIGHT$ (IN$,
      2))
3190  NEXT II
3200  REM
3210  RETURN
3220  REM
3400  REM  DO-SEQ
3410  REM
3420 TC = 0
3430  FOR IC = 1 TO NC
3440  ON (CD(IC) + 2) GOSUB 3600,
      3600,3600,8800
3450  NEXT IC
3455  GOSUB 6000
3460  REM
3470  RETURN
3480  REM
3600  REM  RUN-TRIAL
3610  REM
3620  HOME
3625 RF = 0
3627 TC = TC + 1
3630  FOR I = 1 TO 5: PRINT  CHR$
      (7): NEXT I
3638  PRINT "TRIAL # ";TC
3639  PRINT "SLIDE # ";SP
3640  INPUT "PRESS RETURN TO RUN
      TRIAL:";X$
3660  FOR I = 1 TO 20: PRINT  CHR$
      (7): NEXT I
```

```
3670  REM
3680 VR = 247
3690 DC = 0
3700  REM
3710  IF CD(IC) = 1 THEN DR = 246

3720  IF CD(IC) =  - 1 THEN DR =
     245
3730  IF CD(IC) = 0 THEN DR = 246

3735 VR = 247
3740  REM
3750  FOR IS = 1 TO VA(IC)
3760  GOSUB 8600
3780 DC = DC + 1
3790  GOSUB 8200
3800  IF CD(IC) = 0 THEN DR = 245
     : GOSUB 8600:DC = DC + 1: GOSUB
     8200:DR = 246
3805  IF RF = 1 THEN T = 350: GOSUB
     8100: GOTO 3815
3810  NEXT IS
3815  FOR I = 1 TO 5: PRINT  CHR$
     (7): NEXT I
3820  REM
3830  RETURN
3840  REM
6000  REM    PRINT-RESPONSES
6010  REM
6020  PR# 1
6025  PRINT : PRINT
6030  PRINT  TAB( 5);"SEQ"; TAB(
     10);"TRL"; TAB( 15);"TRV"; TAB(
     20);"SLD"; TAB( 25);"RSP"; TAB(
     30);"COR"
6035  FOR I = 1 TO TC
6040  PRINT  TAB( 5);NS$; TAB( 10
     );TR(I); TAB( 15);SP(I); TAB(
     20);SL(I); TAB( 25);RS(I); TAB(
     30);CR(I)
6060  NEXT I
6100  PR# 0
6110  REM
6120  RETURN
6130  REM
8000  REM  DI09-SETUP
8010  REM
8020 SLOT = 4
8040 DI09 =  - 16384 + SLOT * 256

8045  POKE DI09 + 1,255
8050  POKE DI09 + 3,255
8060  POKE DI09 + 2,0
8070  REM
8080  RETURN
8090  REM
8100  REM  DELAY
8105  REM  ABOUT 74 LOOPS=100 MS
8110  REM
8120  FOR IM = 1 TO T
8130 N = N + 1
8140  NEXT IM
8150  REM
8160  RETURN
8170  REM  ***************
8200  REM  DELAY-RESPONSE
8210  REM  ***************
8214 TR(TC) = TC
8215 SL(TC) = DC
8216 SP(TC) = SP
8217 CR(TC) = CD(IC) + 2
8220  FOR ID = 1 TO TM * 10
8230  IF  PEEK (DI09) = 190 THEN
     RS(TC) = 1:RF = 1: GOTO 8280

8240  IF  PEEK (DI09) = 189 THEN
     RS(TC) = 2:RF = 1: GOTO 8280

8250  IF  PEEK (DI09) = 187 THEN
     RS(TC) = 3:RF = 1: GOTO 8280

8255  IF  PEEK (DI09) = 183 THEN
     RS(TC) = 4:RF = 1: GOTO 8280

8260  NEXT ID
8270  REM
8280  RETURN
8290  REM
8400  REM  ZERO-TEST
8410  REM
8420  IF  PEEK (DI09) = 255 THEN
      PRINT "TRAY SET OK":SP = 0:
      GOTO 8460
8425  PRINT  CHR$ (7)
8440  PRINT "SET TRAY TO ZERO!!!!
     "
8450  INPUT "PRESS RETURN WHEN RE
     ADY";X$
8455  GOTO 8420
8460  REM
8470  RETURN
8480  REM
8600  REM  MOVE-SLIDE
8610  REM
8620 N = 0
8630  POKE DI09 + 1,DR
8640 T = MX
8650  GOSUB 8100
8660  POKE DI09 + 1,VR
8670  IF DR = 254 OR DR = 246 THEN
     SP = SP + 1
8675  IF DR = 253 OR DR = 245 THEN
     SP = SP - 1
8680  IF SP > 140 THEN SP = SP -
     141
8690  IF SP < 0 THEN SP = 141 + S
     P
8695  GOSUB 9000
8700  REM
8710  RETURN
8720  REM
8800  REM  GOTO-SLIDE
8810  REM
8820 VR = 255
8830 DL = VA(IC) - SP
8840  IF DL = 0 THEN  GOTO 8940
8850 DF =  ABS (DL)
8860  IF DL > 0 AND DF <  = 70 THEN
     DR = 254: GOTO 8900
8870  IF DL > 0 AND DF > 70 THEN
     DR = 253:DF = 141 - DF: GOTO
     8900
```

```
8880  IF DL < 0 AND DF <   = 70 THEN
      DR = 253: GOTO 8900
8890  IF DL < 0 AND DF > 70 THEN
      DR = 254:DF = 141 - DF: GOTO
      8900
8900  FOR IL = 1 TO DF
8910  GOSUB 8600
8912 T = 740
8914  GOSUB 8100
8920  NEXT IL
8930  REM
8940  RETURN
8950  REM
9000  REM  DISPLAY-POSITION
9010  REM
9020  VTAB 24: HTAB 1
9030  PRINT SP
9040  REM
9050  RETURN
9060  REM
```

APPENDIX K
SUBJECT INSTRUCTIONS

Introduction

The following presents the instructions read to subjects for various practice and testing sessions.

Introduction Instructions

The purpose of the study in which you are going to participate is to develop a procedure for evaluating rear-view mirror designs for passenger cars.

Rear-view mirrors must be able to do several things. First, they must permit you to see other vehicles behind you. Second, they must permit you to make accurate lane judgements (either near lane or far lane). Third, they must permit you to make accurate distance judgements (how far back is a car behind you). Finally, rear-view mirrors must permit you to accurately judge the movement of vehicles behind you, that is, whether they are getting closer to or further from you or are remaining at the same distance.

You will be asked to make these kinds of judgements for different mirrors in the tests to follow.

MOTION PERFORMANCE

Demonstration Instructions

This is a simulated driving situation. The mirror you will be using is a _____. The condition to be presented is _____. We have made slide pictures of an automobile positioned at various locations behind you. Look through the mirror as you would use your own right side rear-view mirror when actually driving. There are thirty slides, the first one showing a car just slightly ahead of your rear bumper, almost next to you (zero car lengths). Then you will see the car getting further and further behind you, back to about 130 feet (10 car lengths) in the last picture. The order of the pictures are then reversed and you will see the car getting closer. Observe the cars behind you and familiarize yourself with what it looks like and the various positions in the mirror where the image is located. When the car is very close, you may not see it in the mirror. Do not move about in your seat and choose a comfortable position analogous to how you would sit if you were driving.

[Describe characteristics of mirror being tested] Now you can put on your seatbelt and I will start the demonstration.

Training Instructions

Now you will be given three trials of practice before you are actually tested. You will observe the vehicle image, exposed for a one second duration, located between zero and 14 car lengths behind you. Be aware that there is a blank between each successive picture. Following the first slide you will observe the car doing one of three things. It will appear as either getting closer to you, further away, or remaining at a fixed distance. All three practice trials will follow in this manner. I will start the trial, you will observe as many slides as you need in order to come to a decision. When you have decided you will press the response button on the panel in your lap and then tell me your

response verbally. After this I will tell you if you were correct or incorrect and if incorrect I will give you the correct response. If, when the first slide is presented, you do not see a car, then you must immediately press the choice button corresponding to "no car." Also, if you press the wrong button by mistake you must tell me the correct choice.

Actual Test Instructions

Now that you have had a small amount of practice you will be given nine trials of actual testing. Here, the task will be the same, except you will not give me your responses verbally-- simply press the button when you are sure of your choice. Remember, observe the car as many times as you need to make a correct choice; it is more important to get a correct response than a fast one.

POSITION PERFORMANCE

Daytime Demonstration/Training Instructions

Now the next task is something a little different. Here the condition will be daytime. We will use the same mirror. On each trial you will see either one car - a white car - or four cars - one of which will be a white car. In each successive slide you will see the vehicle image located in alternate lanes and at various distances (between zero and ten car lengths at one car length intervals) behind you. The car(s) will be exposed for two seconds for the practice trials. At the end of each exposure you will tell me two things 1) In which lane is the white car? (near or far lane) and 2) How many car lengths is the vehicle behind you? (this can range from zero to ten car lengths).

The practice section will be divided into two sections, a precued and feedback section. First, for four trials I will precue you or tell you the white car's correct lane and number of car lengths back. Then, for the next four trials you will tell me and I will provide feedback as to whether you are correct. If you are correct I will inform you of the correct answer. If you do not see any white car say "no car."

Nighttime Demonstration/Training Instructions

Now the task is something a little different. We will use the same mirror. This task will be done under the night condition. Here, on each trial you will see either one or four cars. If one car is present it may appear in either the near or far lane. If four cars are present at least one car will appear in each lane. The car(s) will be exposed for two seconds, and at the end of each exposure you will tell me only one thing; How many car lengths back is the closest car (from one to ten car lengths). Lane position (either near or far) makes no difference. If a decision is hard to make just do the best you can; guess if necessary.

The practice section will be divided into two parts, a precued and a feedback section. First, for four trials I will precue you or tell you the closest vehicle's number of car lengths back. Then, for the next four trials you will tell me and I will provide feedback as to whether you are correct. If you are correct I will inform you of the correct answer. If you do not see any car(s) say "no car."

Training Instructions (Both Day and Night)

Now you will be given advanced training. Here, you will perform the task the same as was done in the demonstration. Only here you will be precued for 16 trials and given feedback for 16 trials.

Actual Test Instructions (Both Day and Night)

Now you will be given 44 trials of actual testing. Here, you will give me your response as was just done in the training section. I will not be giving precued or feedback trials. You will simply give me your response after each viewing.

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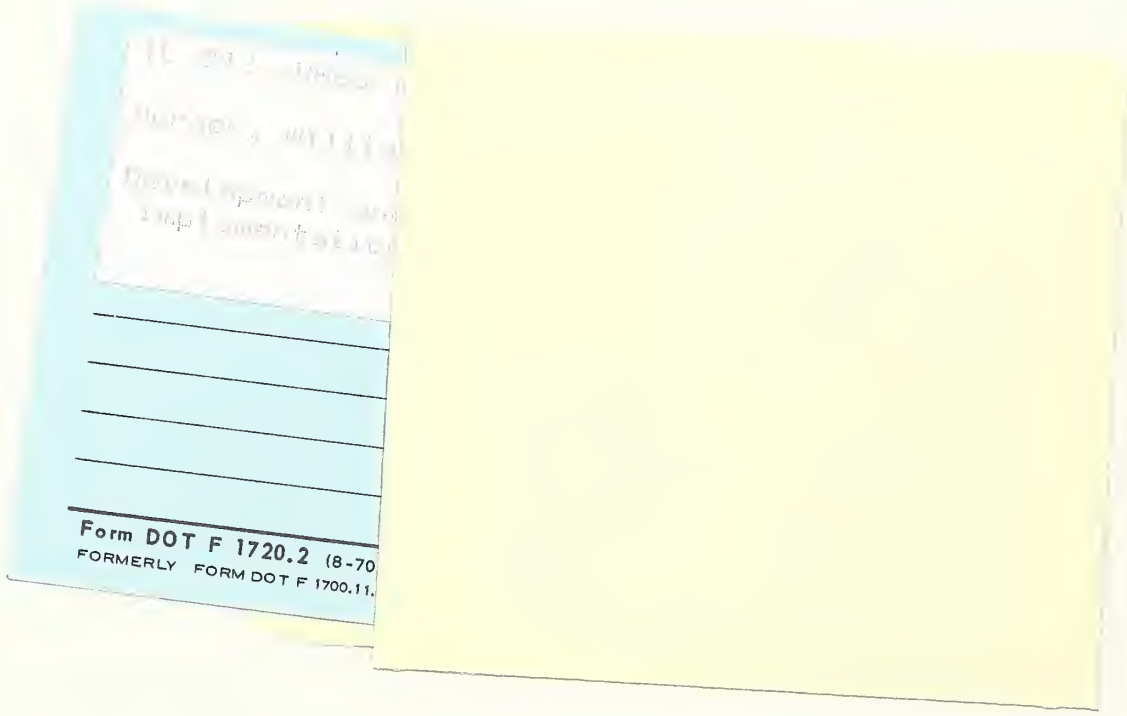
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