AD 430700

44-9

MEMORANDUM REPORT

M64-24-1

UNITED STATES ARMY

FRANKFORD ARSENAL

FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM

by

K. RAISNER

AMCMS 5142.12.13900.01

REPORT M64-24-1

JANUARY 1964

PHILADELPHIA 37, PA.

Qualified requesters may obtain copies of this report from the Defense Documentation Center (DDC), (formerly ASTIA). Cameron Station, 5010 Duke Street, Alexandria, Virginia.

The findings in this report are not to be construed as an official Department of the Army position.

Frankford Arsenal
Philadelphia, Pa. 19137

Memorandum Report M64-24-1
January 1964
AMCMS 5142.12.13900.01

FIRE CONTROL EVALUATION FOR

SS-11/UH-1B WEAPONS SUBSYSTEM

Prepared by: K. Raisner
K. RAISNER
Engineering Technician

Reviewed by: R. C. Pfeilsticker
R. C. PFEILSTICKER
Chief Section B
Development Engineering Branch

W Sperling
W. SPERLING
Chief
Development Engineering Branch

Approved by: W T Abell
W. T. ABELL
Deputy Chief
Fire Control Division

ABSTRACT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55 , which is now used with the SS-11 system, must await the outcome of further test firings.

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Cont'd)

INTRODUCTION

Frankford Arsenal was requested by the Army Weapons Command to study and test new approaches to sighting devices which would enhance the capabilities of the airborne SS-11 missile system. During the course of the program, the Army Missile Command became systems manager and the project was continued and completed under their cognizance.

The SS-11 is a wire guided missile. A missile controller utilizes a hand control stick to transmit yaw and pitch commands to the missile via the wire linkage. In order to provide the missile controller with a means of sensing missile-target deviations at the longer ranges, a high mangnification optical system which provides an image free from vibration or distortion is required. The successful guidance of the missile to the target requires complete attention of the gunner. Any characteristics of the sighting system that distract the missile controller's attention from the guidance task must be eliminated.

The characteristics of the SS-11/UH-1B weapons subsystem which have a direct effect on the design parameters of the sighting system are as follows:

1. Maximum Range - 3500 meters
2. Targets - tank size
3. Severe vibration environment of the UH-1B helicopter
4. Yaw and pitch of the UH-1B helicopter
5. Missile capture problem

The SS-11 sighting system presently in production consists of the XM55 and Mark 8 sights. The missile controller utilizes the XM55 sight consisting of a six power, 11-1/2 degree field of view binocular mounted in gimbals which provide isolation from the helicopter's vibrations. The pilot is provided with the Mark 8 reflex sight which contains an illuminated adjustable reticle pattern. It has been shown that with experience a relatively good percentage of hits can be obtained with the present system. However, the following are some shortcomings in the present system:

1. The pilot is restricted to fly a collision course with the target which necessitates extremely close coordination between him and the missile controller. This dependence on the pilot maintaining a collision course precludes the missile controller from giving his undivided attention to the missile guidance task.

2. The helicopter must have a yaw stabilization system to insure that the missile/target complex remains within the field of view of the XM55 sight, which is necessitated by the "fixed" nature of this sight.

3. The life expectancy of the isolation system of the XM55 is short.

4. The "tuning" of the isolation system of the XM55 is difficult and is easily destroyed if great care is not taken in the handling of the sights.

Because of the problems associated with the existing system, the subject program was initiated.

DISCUSSION

The three sights evaluated were:

1. A Foreign Sight,

2. A gimbal mounted, gyro stabilized monocular sight, hereafter referred to as the Gimbal Mounted Sight, and

3. A head mounted monocular sight, hereafter referred to as the Head Mounted Sight.

A. <u>Foreign Sighting System</u>

1. Description (see figure 1 - schematic of system)

The Foreign sighting system provides the missile controller with a monocular that has a stabilized line of sight in yaw and pitch and a reflex sight for target acquisition. The pilot is provided with the same type reflex sight as the missile controller. Figure 2 shows both sights as mounted in the UH-1B helicopter.

The stabilization of the monocular's line of sight is accomplished by control of a prism located in front of the monocular's objective lens. A two degree of freedom gyro senses the yaw and pitch motions of the helicopter. Corrections to the line of sight to compensate for the yaw and pitch motions are transmitted to the prism by means of a servo chain drive. High frequency helicopter vibrations are isolated from the sight by means of three spring-air damper vibration isolators.

The reflex sights are very similar to the Mark 8 sight. The illuminated adjustable reticles consist of a vertical elevation scale graduated from zero to 30 degrees in two degree increments from top to bottom. Two vertical lines, five degrees on either side of the elevation scale are also provided.

2. Pertinent Characteristics

a. Reflex Sight - pilot

(1) Magnification - unity

(2) Reticle brightness - adjustable

(3) Weight - 4.85 lbs.

b. Reflex Sight - missile controller

(1) Magnification - unity

(2) Usable angle in elevation - 30°

(3) Usable field of view in azimuth - ±5°

(4) Reticle brightness - adjustable.

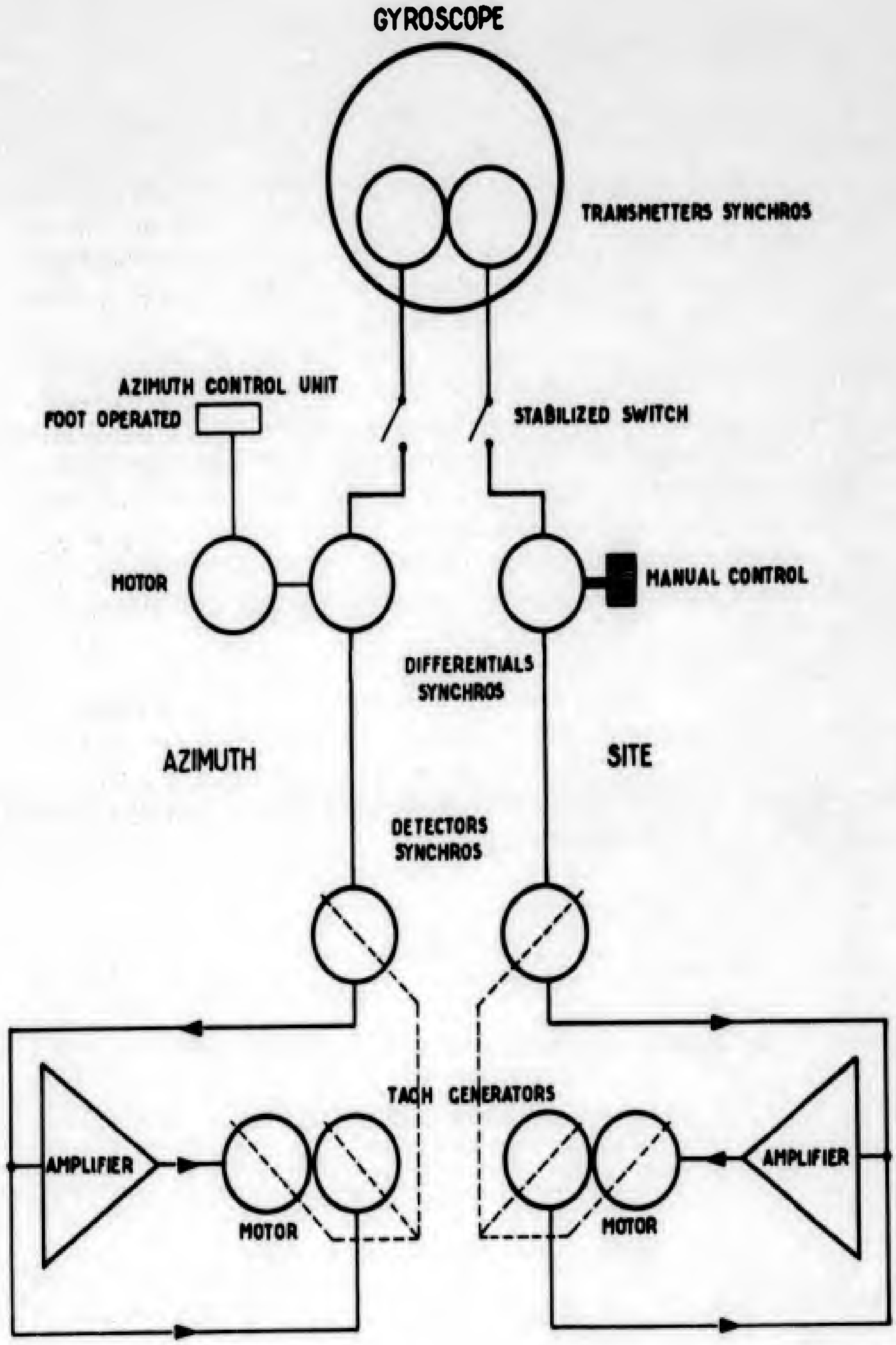

Figure 1. Schematic of Foreign Sighting System

Figure 2. Foreign Pilots and Missile Controller's Sights Installed

c. Monocular Sight - missile controller

(1) Magnification - 7x

(2) Field of view - 11°

(3) Limits of prism rotation

(a) Elevation +14°, -9°

(b) Azimuth ±18°

(4) Reticle - crosshair

(5) Weight 13.6 lbs. including reflex sight

d. Total system weight - 48.4 lbs. including sights, electronics, cabling, etc.

3. Operation

When a target is first seen by either pilot or missile controller, its position is located on the reticle of both reflex sights. If the pilot sees the target first, he flies the aircraft on target in azimuth and then tells the missile controller at which value on the elevation scale the target is located. If the missile controller sees the target first, he either "talks" the pilot on course or momentarily flies the aircraft on course in azimuth and then tells the pilot the value on the elevation scale at which the target is located. When both pilot and missile controller have located the target on their reflex sights, the pilot maintains the helicopter on target in azimuth.

By use of the "manual control" as shown on figure 1, the missile controller rotates the prism in the monocular sight to correspond to the indicated elevation scale reading of his reflex sight. He then energizes the stabilization system and a light on the pilot's reflex sight comes on indicating that the controller is ready to fire and that he must maintain a collision course with the target at least until after missile launch. The missile controller now fires the missile and he guides the missile viewing with the left eye through the reflex sight until the missile is well within the plus or minus 5° azimuth zone and within plus or minus 5° of the target in elevation. He then transfers vision to the right eye viewing the missile target complex through the monocular sight for terminal guidance. From the moment of missile capture until target impact, the missile controller corrects for target movement or helicopter drift by operation of the azimuth and elevation controls of the monocular sight. The elevation control is a knob located on the body of the monocular sight; the azimuth control is a foot pedal. The pilot can fly mild evasive courses within the azimuth and elevation limits of the prism.

B. Head Mounted Sight

1. Description

The head mounted sight, developed under contract, (see figure 3) consists of a six power monocular positioned for use with the right eye and an open ring sight positioned for use with the left eye. The monocular and ring sights are both attached to a headband coupled directly to the missile controller's head as shown on figure 4.

Performance of the head mounted sight depends entirely on the body isolating the high frequency helicopter vibrations and head movements correcting for helicopter yaw and pitch, target motion, and helicopter drift.

2. Pertinent Characteristics

a. Monocular

(1) Magnification - 6x

(2) Field of View - 8 1/2°

3. Operation

Upon locating a target, the pilot flies the helicopter generally on target in azimuth using the helicopter radio antenna as a reference.

The missile controller positions the target in the center of the ring sight which in turn positions it in the center of the monocular; both sights having been previously boresighted. The missile controller fires the missile and guides it, viewing through the ring sight using the

Figure 3. Head Mounted Sight

Figure 4. Head Mounted Sight (In Operation)

left eye, to near the center of the ring sight. Upon centering the missile in the ring sight, the controller transfers his vision to the monocular and views the missile using the right eye for terminal guidance. From the time of missile capture the controller corrects for helicopter yaw and pitch, target motion, and helicopter drift with head movements. After launch, mild evasive maneuvers can be taken by the pilot.

C. Gimbal Mounted Sight

1. Description (see figure 5 - schematic of system)

The Gimbal Mounted Sight, also developed under contract, consists of a six power monocular and open ring sight mounted to an elevation gimbal which in turn is mounted in an azimuth gimbal (see figure 6). Stabilization is effected by utilizing two rate gyros mounted on the elevation gimbal. The gyros are positioned such that they sense any inputs about the azimuth and elevation axes. The gyro signals are fed through a servo loop to azimuth and elevation torquers which correct the gimbals in order to maintain the desired line of sight. A manual override of the servo system is utilized for target motion and helicopter drift.

2. Pertinent Characteristics

a. Monocular

(1) Magnification - 6x

(2) Field of View - 11 1/2°

b. Weight - 62 lbs. including sight, electronics, roof mounting, cabling, etc.

3. Scanning Limits

(1) Azimuth - ±45°

(2) Elevation - ±20°

4. Operation

When airborne, the missile controller energizes the stabilization system. The system provides two modes, namely, synchro cage and

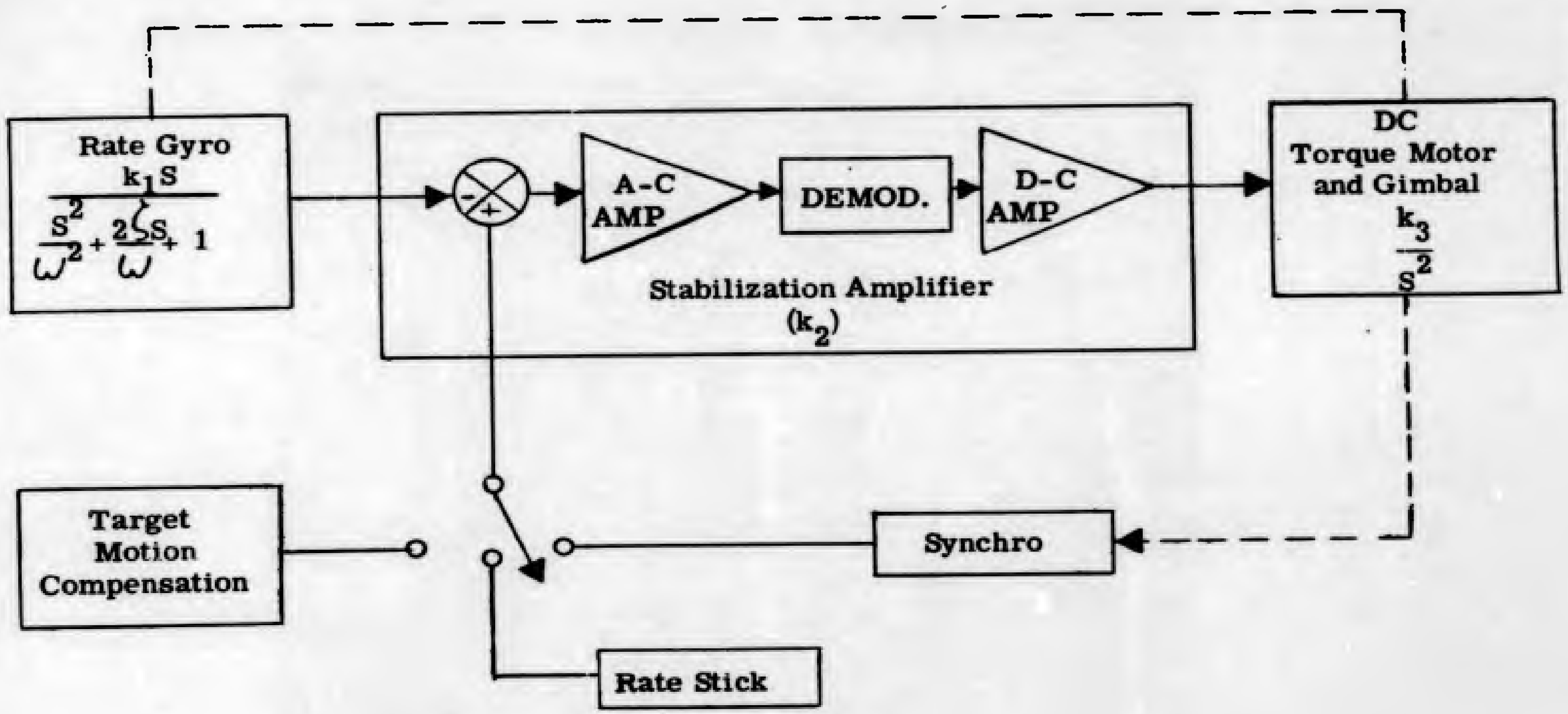

Figure 5. Schematic of Gimbal Mounted Sight

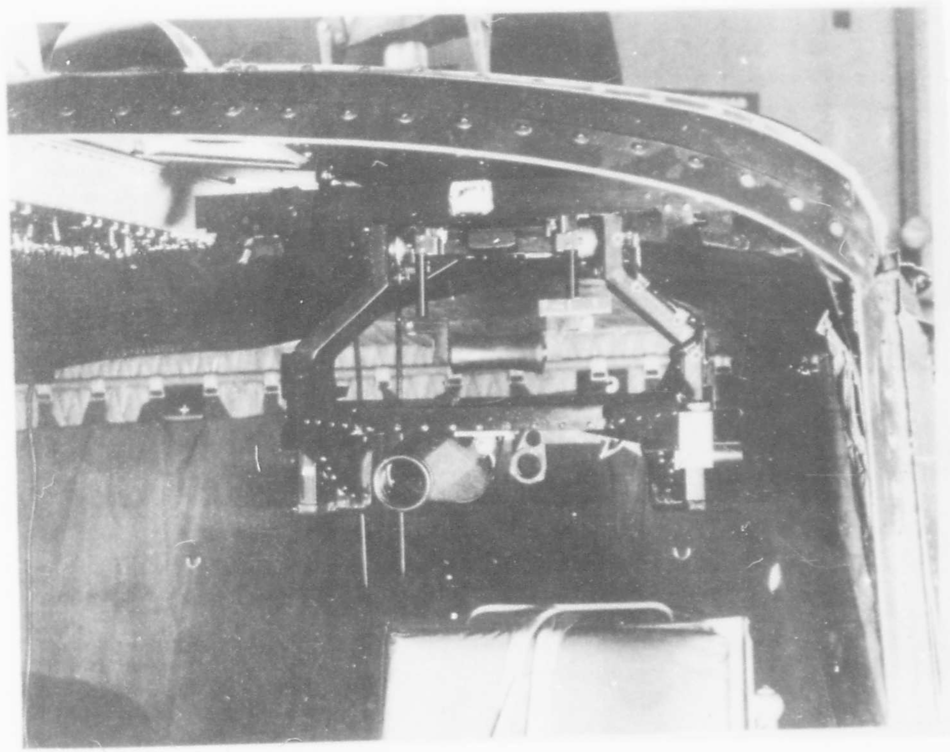

Figure 6. Gimbal Mount Sight Installed

operate. In the synchro cage mode, all elements of the system are in operation, however, the sight line is fixed along the longitudinal axis of the helicopter. In the operate mode, the sight can be placed on target within the scanning limits and will remain there regardless of helicopter yaw and pitch motion. Synchro cage is mainly a standby mode to be used while the pilot and controller are locating the targets. During a missile firing the sight will always be in the operate mode.

Upon locating a target, the pilot flies the aircraft generally on target in azimuth using the helicopter radio antenna as a reference. The missile controller positions the target in the center of the ring sight which in turn positions the target in the center of the monocular, both sights having been previously boresighted. The missile controller now fires the missile, viewing with the left eye through the ring sight, and guides it to near the center of the ring sight. When the missile nears the center of the ring sight the controller transfers vision to the monocular and views the missile with the right eye for terminal guidance. From the moment of missile capture, the controller corrects for target motion and drift by moving the azimuth and/or elevation gimbal by hand. After launch, mild evasive maneuvers can be taken by the pilot.

TEST CONDITIONS AND RESULTS

A. Test Conditions

1. Range - 2500 meters

2. Helicopter speed - 80 knots (approximately) and hover

3. Helicopter altitude - approximately 150 feet

4. Missiles - 26

5. Missile controllers - One very experienced and two relatively inexperienced missile controllers were utilized.

6. Helicopter courses - hover, collision, offset, zigzag (see figure 7 for pictorial representation of courses flown).

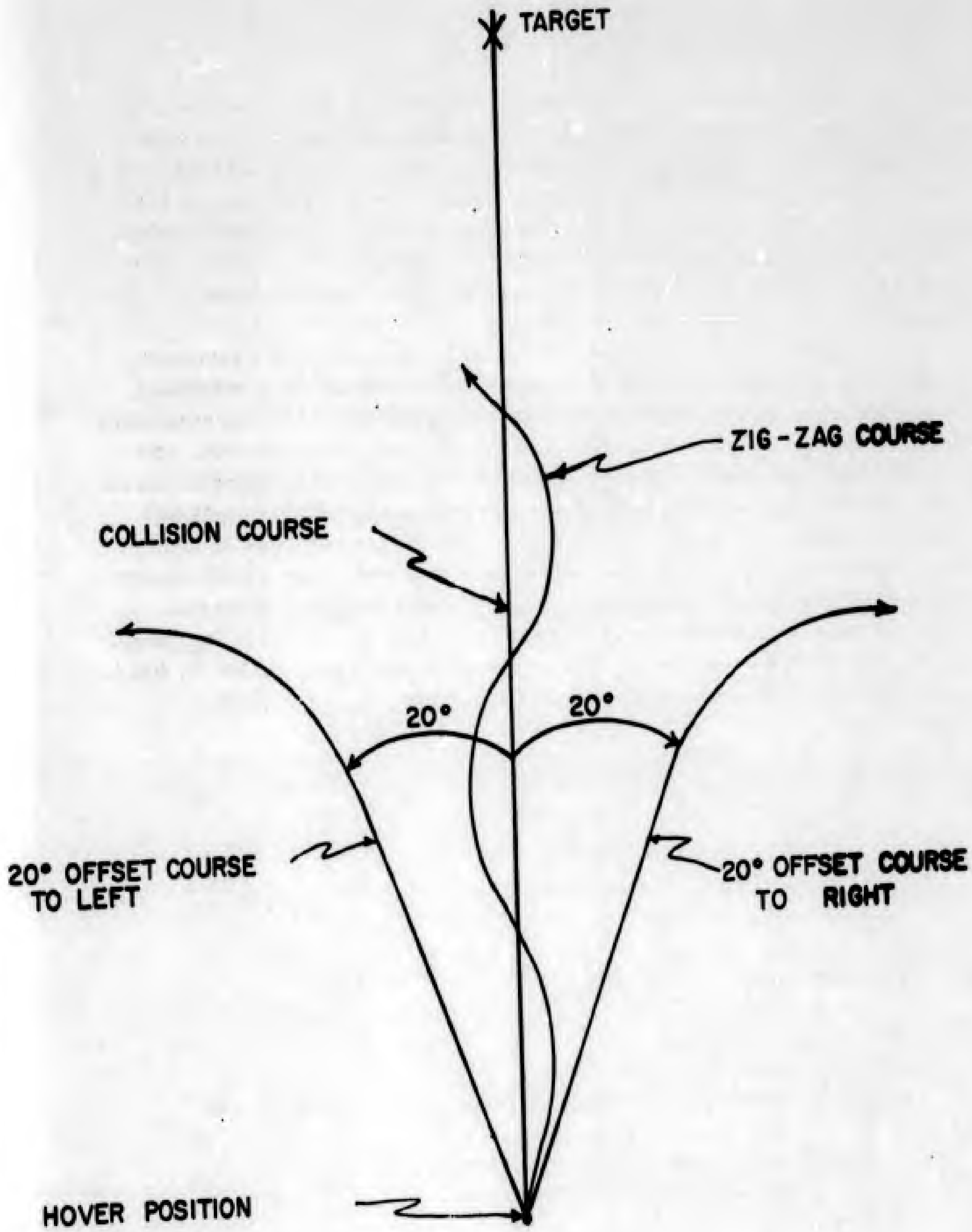

Figure 7. Helicopter Courses

B. Results

1. Foreign Sight

Note: Smoke emitted from the exhaust of the missile interferred to some extent on almost every firing.

a. General

(1) The view seen through the monocular was slightly blurry (double image) throughout the test. Possible reasons for this may be:

(a) Vibration isolation system not tuned exactly

(b) Inherent vibrations in the servo system

b. Specific

(1) Twenty degree offset course firings - two hits in four attempts - one near miss.

(2) Zigzag course firings - one hit in four attempts

(3) All firings were conducted by a very experienced missile controller.

2. Head Mounted Sight

Note: Smoke emitted from the exhaust of the missile interferred with the missile controller's vision on several firings.

a. General

(1) A low frequency pitch oscillation was continually evident through the monocular during the test.

(2) The transfer from left eye to right eye was accomplished easily after a period of learning.

(3) Nausea was not evident during short firing runs, however, with continued use (periods of one-half to one hour) nausea did develop.

(4) The pressure of the headband on the controller's head was uncomfortable.

(5) Film records taken during the test show that once captured, the missile/target complex could be maintained in the center of the monocular field of view. These films were recorded during hover, 20, 40, 60, 80 and 100 knots helicopter air speed.

b. Specific

(1) Collision course firing - zero hits in nine attempts - five near misses.

(2) Five firings were accomplished by an experienced missile controller who obtained four near misses. The remaining four firings were conducted by a relatively inexperienced missile controller who obtained one near miss.

3. Gimbal Mounted Sight

Note: Smoke emitted from the missile exhaust was much less a problem during firings utilizing this sight than those utilizing preceding sights. The exact reason for this is not known; however, it may be assumed that the smoke problem was a function of missile characteristics and meteorlogical conditions.

a. General

(1) The target was clearly resolved at much farther ranges than with either of the preceding sights (4000 meters).

(2) Overriding the servo system by hand did introduce some vibration to the gimbals.

b. Specific

(1) Hover firings - two hits in two attempts. Both hits were obtained by an experienced missile controller.

(2) Collision course firings - two hits in four attempts - one very near miss. The two hits were obtained by the experienced missile controller. The very near miss and the one total miss were obtained by an inexperienced missile controller.

(3) Twenty degree offset course firings - zero hits in two attempts - one near miss. Both the near miss and the total miss were obtained by the experienced controller.

COMPARISON AND CONCLUSIONS

Because an insufficient number of missiles was fired with each sighting system, meaningful hit probabilities can not be computed. The percentage of hits obtained, however, does give an indication of the learning time and ease of use of each system. In this respect alone, the number of hits and near misses achieved with the Gimbal Mounted Sight indicates that it is superior to the Foreign or Head Mounted Sight. In addition to performance, a comparison of these demonstration sighting systems must be considerate of specific design features, degree of complexity, cost, reliability, etc. Following is a brief discussion of these factors, which are pertinent to each system.

A. Foreign Sight

The Foreign Sight is by far the most complex of the sighting systems evaluated. This system has more components and operations than the other systems and appears to complicate the SS-11 sighting need considerably.

The servo system of the Foreign Sight is considerably more complicated than that of the Gimbal Mounted Sight and is subject to possible errors due to the chain drive of the prism. The spring damper vibration isolation system requires varying degrees of adjustment and tuning for individual helicopters. The "softness" imparted to the sight by the isolation system can be harmful since the operator can "bottom" the springs by leaning too hard against the sight, thereby causing sight vibration. The location of the sight is too low for most operators and it does not stow out of the operator's way.

The Foreign Sight has not proved superior to the other sights and, therefore, is not considered desirable for the SS-11/UH-1B weapons subsystem.

B. Head Mounted Sight

The concept of the Head Mounted Sight is the most desirable in many respects (i.e. simplicity, maintenance, cost, etc.). The results of the evaluation cannot definitely dismiss the head mounted concept; however, some serious problem areas have been revealed. These problems are discussed below.

The definition of the target is not sufficiently clear which is partially due to an elevation oscillation imparted to the monocular through the missile controller's body. This oscillation could be due to the excess weight of the monocular which could be reduced in further development. To reduce slippage between the headband and the head, the band must be tightened to an uncomfortable pressure. However, with continued use, the controller could be accustomed to the pressure for the short period of time involved. Nausea was prevalent when the monocular was used for extreme periods. The most serious problem, however, is that the controller is distracted from the missile guidance task, since he must continually track the target with head movements in order to maintain the target/missile complex near the center of the monocular field of view. This tracking includes the motions required to compensate for the continual disturbance of the sight line caused by the yaw and pitch of the helicopter as well as the minor motions required to correct for the relative translational motions between helicopter and target. The required continual compensation appears to reduce the level of the missile controller's performance considerably. The Foreign and Gimbal Mounted Sights automatically compensate for roll and pitch disturbances and require only periodic adjustment for translational effects.

C. Gimbal Mounted Sight

The Gimbal Mounted Sight proved to be the most desirable of the sights evaluated. Target definition was extremely clear providing better potential for hits at the farther ranges. The sight enhanced the controller's capabilities by freeing him almost completely from sighting worries as opposed to the Head Mounted Sight where head tracking is constantly required. The sight is stowed in the roof area of the helicopter, which eliminates the safety hazard as much as is practical. No serious problems of missile capture were evident.

If, in the future, it is decided to produce the Gimbal Mounted Sight in quantity, some improvements should be incorporated in the final production design. These improvements are:

1. Reduction in size and weight

2. More convenient positioning of the electronic controls

3. Redesign of the ring sight

4. Redesign of the present headrest

5. Redesign of the stowage mechanism to be compatible with the windshield wiper recently added to the missile controller's forward roof area.

D. Additional Comments

These comments are not made regarding the particular sighting systems under test, but are offered as general information gained during the evaluation test program.

1. Evasive maneuvers of a zigzag nature may not be practical because of the short time of flight of the missile. The only practical maneuver appears to be an offset course after launch.

2. The smoke emitted from the missile exhaust in some instances is a serious detriment to viewing the flare and target.

RECOMMENDATIONS

It is recommended that further firings be conducted with the Gimbal Mounted Sight. The purpose of these firings would be to obtain quantitive hit probability data during various modes of fire. Of special interest would be the results of those firings conducted during offset helicopter courses after launch in order to determine the feasibility of this maneuver.

It is planned to modify the present Gimbal Mounted Sight to accept a binocular. The test would then include firings with the binocular for comparison with the monocular, primarily to evaluate the binoculars capability of enhancing the missile controller's depth perception. The firings also could be utilized as a major input to an engineering test of the Gimbal Mounted Sighting System.

The test conditions should be approximately as follows:

1. Range - 3000 meters

2. Helicopter speeds - hover and 80 knots

3. Altitude - 150 meters

4. Missiles - 40

   a. 10 - hover

   b. 10 - collision

   c. 10 - 20° offset right

   d. 10 - 20° offset left

5. Gunners - at least two with relatively high level of experience

6. The missiles would be divided evenly between moving and stationary targets.

If the results of the above test were to prove favorable consideration should be given to phasing the Gimbal Mounted Sight into the SS-11 system after the improvements mentioned in Conclusions have been incorporated.

DISTRIBUTION

17 - Commanding Officer
Frankford Arsenal
Philadelphia, Pa. 19137
Attn: Assoc. Dir. Fire Control, 1000 (1)
Thru: Chief, 1500
Chief, 1510 (1)
K. Raisner, 1512 (2)
R. C. Pfeilsticker, 1512 (2)
Thru: Senior Scientist, 0100
Library, 0270 (1)
1214 (10)

1 - Headquarters
U.S. Army Materiel Command
Attn: Mr. R. Cory
AMCPM-A1
Washington 25, D. C.

1 - Attn: Mr. N. Fredrickson
AMCPM-A1

1 - Commanding General
U.S. Army Munitions Command
Attn: Mr. I. Williams
AMSMI-RIR
Dover, New Jersey

1 - Attn: C. Elrod
AMSMI-RIR

1 - Commanding General
U.S. Army Test & Evaluation Command
Attn: Mr. Bonnett
Rocket & Missile Br.
Aberdeen Proving Ground, Md.

1 - Attn: Mr. Noonan
Infantry & Aircraft Weapons Div.

1 - President
U.S. Army Aviation Board
Attn: Major Martin
Fort Rucker, Alabama

10 - Defense Documentation Center
Cameron Station
5010 Duke St.
Alexandria, Va.

AD-
M64-24-1

ACCESSION NO.

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-
M64-24-1

ACCESSION NO.

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-
M64-24-1

ACCESSION NO.

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-
M64-24-1

ACCESSION NO.

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-　　　ACCESSION NO.

M64-24-1

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-　　　ACCESSION NO.

M64-24-1

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-　　　ACCESSION NO.

M64-24-1

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

AD-　　　ACCESSION NO.

M64-24-1

Frankford Arsenal, Philadelphia, Pa. 19137
FIRE CONTROL EVALUATION FOR SS-11/UH-1B WEAPONS SUBSYSTEM by K. Raisner

Memorandum Report M64-24-1, January 1964, 21 pp incl illustrations (AMCMS Proj 5142.12.13900.01)
UNCLASSIFIED REPORT

An evaluation of three sighting systems for use with the helicopter mounted SS-11/UH-1B weapons subsystem is presented. The sighting systems evaluated are a Foreign Sight, a Head Mounted Sight and a Gimbal Mounted Sight. The latter two sights were developed under contract to Frankford Arsenal. The evaluation demonstrates that the Gimbal Mounted Sight is the most desirable of the three sighting systems considered. The future use of the Gimbal Mounted Sight as a possible replacement for the XM55, which is now used with the SS-11 system, must await the outcome of further test firings.

UNCLASSIFIED

1. SS-11/UH-1B Weapons Subsystem
2. Foreign Sighting System
3. Head Mounted Sight
4. Gimbal Mounted Sight

I. Raisner, K.
II. AMCMS 5142.12.13900.01

DISTRIBUTION LIMITATIONS
Qualified requesters may obtain copies of this report from DDC.

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED