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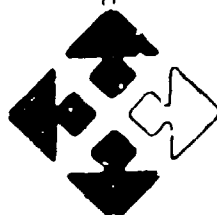
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# THE EVALUATION OF SMALL ARMS EFFECTIVENESS CRITERIA

## VOLUME II: APPENDIXES

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THE EVALUATION OF SMALL ARMS EFFECTIVENESS CRITERIA

VOLUME II: APPENDIXES

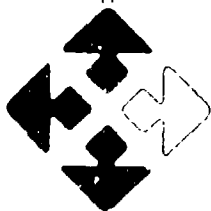
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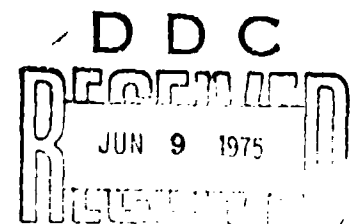
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## Appendix A

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## Appendix B

### REVIEW OF SMALL ARMS LETHALITY TESTING

#### INTRODUCTION

This appendix includes the following:

- o Review of existing wound ballistics combat results and test data.
- o Analysis of certain combat and test data.
- o Comparison of data with currently used lethality models.
- o Conclusions concerning testing and lethality differences among standard bullets.

A basic understanding of the mechanisms of wounding by bullets has been pursued by surgeons and medical researchers for over a century. The "explosive" wound damage effects of bullets were first noted by Huzier in 1848 in Paris. The hydrodynamic nature of the extensive internal damage or "explosive" cavity caused by high-velocity bullets was first recognized by a Swiss researcher, Kocher, in 1874. By the turn of the century, bullet flattening and shock wave transmission had been eliminated as mechanisms; in 1898, Stevenson had, from surgical observation, correctly defined the major damage mechanism as the cavity in the wake of the bullet caused by the outward momentum imparted to tissue fluids.

The 1928 "Pig Board" firings and wound autopsies established what had already been suspected: that bullet velocity, tumbling, and energy loss were closely related to wound damage and that bullet caliber was not. World War II research by Harvey and others at Princeton treated the quantitative physics of wounding as a branch of underwater ballistics, having established by ultra-high-speed photography and X-rays that bullet cavities in water show behavior analogous to that of bullet temporary or "explosive" cavities in tissues.\*

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\*For a more detailed history of wound ballistics, see U.S. Army, Office of the Surgeon General, Wound Ballistics, edited by James C. Beyer (Washington, 1962). For the physics of wounding, see Chapter III.

Despite the advances in understanding the fundamental physics of wounding that were achieved in World War II, little or no research was undertaken to directly compare the wounding effectiveness of bullets of various shapes, velocities, and sizes (though some work was done on fragment sizes). The Pig Board tests remain the last scientifically credible experimental comparison of bullets of varying caliber.

Little progress has been made since World War II in the basic understanding of the mechanisms of wounding. Most attention in the area has focused on "optimizing" fragmentation, improving body armor, and devising and applying computer models for predicting incapacitation by various fragments and bullets. These models have, in fact, considerably less scientific validity than the World War II work; as a result, they have introduced much confusion and erroneous quantification into the evaluation of small arms wounding effectiveness--as will be seen.

#### THE TREND TOWARD SMALLER CALIBERS

Since the Civil War, whenever the question of introducing a smaller caliber cartridge has arisen, military developers and users have expressed concern that the smaller caliber may have insufficient "stopping power" and may be unlikely to "do the job." These objections were raised when the large (circa .40 to .60 caliber) and subsonic balls of the Civil War era were being replaced by 7.9- to 6.5-mm cartridges (about 2000 to 2800 fps) toward the end of the 19th century. Similar objections were raised again in the 1920s, when the .276 caliber was proposed (and defeated). The insufficient "stopping power" issue was heard again in the 1960s, when the 3200 fps 5.56 mm was proposed as a replacement for the 2800 fps 7.62 mm. In each case after adoption, surgical observation of combat casualties indicated that, if anything, the smaller-caliber, higher-velocity bullet created greater wound damage than its predecessor.

#### WOUND DAMAGE MECHANISMS

Based on the World War II wound ballistics research, it appears that most of the damage caused by a bullet owes to the violent expansion and

construction of the large temporary cavity formed in the wake of high-velocity projectiles of any shape. This temporary cavity can fracture bones and rupture organs at significant distances from the bullet path. The diameter of the damage zone is apparently directly related to the diameter of the temporary cavity. The diameter of the temporary cavity at any point is proportional to the square root of the space rate of projectile energy loss at that point, or, equivalently, to the energy of the projectile times the retardation coefficient at that point. Thus, the diameter of the temporary cavity can vary widely--even for spherical projectiles--as tissues of varying resistance are encountered.\*

Bullets, which are stabilized by the slight excess of gyroscopic spin forces over drag forces in air, become suddenly unstable upon entering the medium of tissue, which is 800 times denser than air. How fast they tumble in homogeneous tissue depends almost entirely on their transverse rotational moment of inertia and their yaw angle at impact. Thus, small bullets striking at moderate yaw angles of a few degrees will tumble much faster than highly stable, massive, point-on bullets of the type designed for minimum long-range dispersion. Yaws as fast as  $90^\circ$  in 3 inches have been observed. However, all high-velocity spitzer bullets will experience some tumbling due to tipping by external clothing or equipment and by internal inhomogeneities.

The significance of tumbling is that bullet retardation increases roughly as the square of yaw. Thus, a bullet at right angles to its path experiences approximately 50 times the retardation--and therefore produces a wound cavity diameter 50 times as large--as the same bullet point-on.\*\* Thus, rapid tumbling before bullet exit is the most significant determinant of wound cavity size for bullets of comparable velocity, and it dominates such factors as bullet mass. Rapid tumbling, high-damage bullets are achieved by obtaining some yaw at impact, low rotational moment of inertia around the transverse axis, and high velocities. In other words, the most

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\*For a more detailed discussion, see U.S. Army, Office of the Surgeon General, Wound Ballistics, Chapter III.

\*\*Ibid., Chapter II.

lethal bullets will be fast and small\* and should have the least possible stability consistent with acceptable dispersion.\*\*

It is important to note that the above physical insights, although sufficient to guide bullet design and comparisons of qualitative wounding effectiveness, are not in any sense sufficient to provide quantitative predictions of serious casualty production or incapacitation. That is because the location of the temporary wound cavity relative to vital organs exerts an even more powerful (and unquantified) effect than the size of the cavity.

As a result of the most recent controversy, the 5.56-mm versus the 7.62-mm bullet, a number of research efforts were mounted, but they produced fragments of data that shed little new light and, in fact, often contradict each other. Reports and studies citing these data have, over the last ten or twelve years, created the general impression that significant differences in lethality exist between the 5.56-mm and 7.62-mm bullets. The validity of such a conclusion is an important matter and should therefore survive any fair and objective challenge. The remainder of this appendix examines the evidence for and against the existence of significant lethality differences in current standard rifle bullets.

#### TYPES OF EMPIRICAL BULLET LETHALITY DATA

There is little direct combat evidence of important variations in lethality among the standard rifle bullets in use since World War I. Comparable samples of casualties caused by several different kinds of bullets under similar exposure and range frequency conditions are rarely present in one country's force. Furthermore, little effort has been devoted to collecting detailed bullet wound data in any country. The data that are available are discussed below.

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\*Bullets that are too fast and too small will not penetrate grass, brush, outer clothing, and equipment adequately because they will explode into tiny fragments upon contact. The limits of how small and how fast bullets can be made and still remain useful are not known.

\*\*In light of this, the AMC decision to increase the twist of the M16 from 1 in 14 inches to 1 in 12 inches to increase the stability of the bullet under extreme arctic conditions (thereby achieving a just-noticeable decrease in dispersion at -60°F) has decreased the weapon's overall effectiveness. Fortunately, the bullet is still more than adequately lethal.

Because direct casualty evidence is in short supply, weapon developers have turned to substitute evidence. This usually involves estimating or inferring human incapacitation from bullet performance in some substitute material. (Cadavers cannot be used for valid lethality tests because they present far different mechanical properties to bullets than do live bodies.) Two types of substitutes have been used: animals and blocks of firm gelatin (which has penetrability properties similar though not identical to human muscle tissue). It is obvious that these substitutes are not the same as human bodies. Thus, lethality predictions made from tests using them must be applied with caution. It is therefore useful to consider how much direct evidence of bullet lethality in humans is available before discussing the use of substitutes.

#### COMBAT EVIDENCE OF BULLET LETHALITY

Usable data on the severity of wounds produced by rifle and machine gun bullets are not available for all casualties recorded by the U.S. Army, in part because the wounding agent (bullet, fragment, etc.) identified by surgeons or recorded in grave registrations is often in question, and in part because the circumstances of each casualty incident are not recorded. However, several samples of detailed small arms casualty data were deliberately collected during World War II, and they provide insights into bullet lethality. The most detailed data come from two samples, one of 213 bullet casualties in the New Georgia and Burma campaigns and the other of 59 bullet casualties in the Bougainville campaign.\*

In these two samples the portion of rifle casualties who were killed or hospitalized (at any level above an aid station) was about 82 percent; for machine gun casualties it was about 92 percent. Even first-echelon hospitalization for bullet wounds required an average of 15 to 17 days. Of the total of men hit by rifle bullets, about 26 percent died and 41 percent had wounds so serious that they were evacuated to rear echelons or

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\*U.S. Army, Office of the Surgeon General, Wound Ballistics, pp. 264-266 and p. 433, respectively.

the United States; for machine gun casualties, about 45 percent died and 40 percent required evacuation to rear echelons or the United States. The vast majority of small arms casualties were hit by the 6.5-mm Japanese rifle bullet, a moderate-velocity (2400 fps) bullet observed by military surgeons to cause especially grave wounds.\* The relatively large wound damage effects of the 6.5-mm bullet apparently owed to its thin rear jacket design, which caused (intentionally or unintentionally) both high yaw (e.g., low stability) and separation of bullet from jacket on impact.

No detailed casualty surveys of adequate sample size covering both wounded and killed casualties resulting from specific, known engagements are available for other small arms and other theaters. Surgical observations exist on the relative severity of wounds from other types of bullets; of some interest is the observation that, as expected, wounds from pistol bullets (800 to 1200 fps) are significantly less severe than high-velocity rifle bullet wounds, and .30 caliber carbine wounds (1975 fps) are more like pistol wounds than rifle wounds.\*\*

None of the available casualty surveys give any direct data concerning incapacitation, and time to incapacitation, of the casualty cases. Despite this, current computer lethality models attempt to predict incapacitation effectiveness (according to allegedly precise criteria of time and function--attack or defense) rather than to predict casualty production, say, the level of hospitalization required. Thus, these models are predicting quantities that have never been measured and probably never will be.

#### CONTROLLED TESTS USING SUBSTITUTE TARGETS

Of the two types of substitute targets, live animals are recognized to better simulate the human body, but gelatin blocks are far easier and less expensive to use.

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\*Ibid., pp. 19, 96.

\*\*Ibid., p. 94.

The object of experiments with substitute materials is to predict the seriousness (or the incapacitating effects) of wounds produced in men, so it is important to know how well these experiments help to predict wound severity. Certainly, if one is to have confidence in such predictions the tests must produce data that allow calculating the effect of:

- o Expected distributions of hit locations on the body and of directions of bullet travel within the body (and thus of the bullet's opportunity to cause damage to internal organs most likely to incapacitate).
- o Bullet penetration of clothing and equipment covering the body at the hit location, both in terms of the energy loss outside the body and the induced tumbling.
- o Bullet penetration of various internal tissues and bones that affects the tumbling and energy transfer of the bullet as it traverses the body.
- o Bullet striking velocity and yaw at impact, which depend on the range from the weapon to the target.

If bullet lethalties are to be compared on the basis of the "typical" hits on a soldier in combat, then it is essential that "typical" hits represent the expected distribution of locations and directions. The location of hits has been extensively studied in combat casualty surveys during the Civil War, World War I, World War II, in Korea and, to some extent, Vietnam. Direction of bullet travel through the body is rarely recorded; there exist essentially no usable distributions of directions of bullet paths relative to the body. The plausible assumption, used in most computer lethality models, that hits are random and proportional to the size of the body component's presented area has been demonstrated to be false. Almost all casualty surveys show a significantly higher than predicted percent of hits on the head and significantly lower than expected hits on the abdomen

and legs.\* In the absence of a combat-verified distribution of hit locations and directions for bullets, it seems unlikely that models for predicting lethality can have much validity.

A soldier engaged in front-line combat is always covered with layers of clothing and items of equipment (cartridge belt, suspenders, ammunition pouches, canteen, first aid kit, etc.); he is likely to be wearing a steel helmet and perhaps an armored vest. These items must be penetrated by a bullet before it penetrates his body. They add protection insofar as they decrease the bullet's energy and sometimes deflect it. However, they can significantly increase bullet damage by increasing its yaw angle and accelerating the tumbling process. (These effects of clothing and equipment have never been tested or included in current lethality modeling.) Similarly, after bullets begin to penetrate the body they may encounter bone and tough membrane, which can either protect vital organs or can accelerate tumbling.

Comparing animal targets and gelatin targets, it appears that most of the important internal and external effects on bullet lethality could be tested using animals, though such tests cannot lead to accurate quantitative prediction of human incapacitation. Test animals can be oriented toward the weapon and shielded by armor plate so as to achieve reproducible hit locations and bullet path angles relative to the body. They can be covered by clothing and equipment to provide data on the effects of these elements on bullet performance. Their bone structures and internal organs are not similar enough to man's to provide lethality quantification, but they can approximate the principal internal effects on bullet behavior. Bullet yaw before impact can be measured in order to control the effect of this critical variable. However, few of these aspects have been adequately represented in animal tests since World War II, as discussed below.

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\*The presented areas used for prediction are almost always those of the full standing figure. As the casualty data show, this is hardly the average posture or exposure in combat; men are more likely to be crouching or prone and half exposed or in foxholes. The uniformly random hit distribution for bullets is further distorted by the effects of aiming, which are probably significant at close ranges.

Gelatin blocks, on the other hand, have little in common with the human body. They represent homogeneous muscle tissue only approximately (e.g., with about 22 percent lower drag coefficient and considerably different temporary cavity volumes and pulsations), but they do not represent any other component of the body. At most, gelatin block tests can be used to determine relative distance to tumble as an indicator of relative wound damage.\* The blocks can be covered with appropriate clothing and equipment, and their surfaces can be oriented at angles to the bullet's path to determine the effects of covering materials and obliquity on distance to tumble. Except for one laboratory test under unrepresentative ballistic conditions,\*\* gelatin tests have included only normal impact angles on "nude" gelatin.

#### RESULTS OF ANIMAL TESTS

The animal test data that this study has identified include one test using pigs and several tests using rabbits, cats, and goats. Only one of the latter involved the use of bullets and collected adequate data. The outstanding result of these tests was the seriousness of the wounds produced by all the bullets used, ranging from 5.56 mm to .30 caliber.

The pig tests were conducted by the U.S. Army in 1928 in support of a board appointed to recommend a cartridge for a new semiautomatic rifle.\*\*\* (The board has since become known as the "Pig Board.") Bullets of similar shape ranging from .256 to .30 caliber were fired, at muzzle velocities of 2700 fps, at anesthetized pigs located 300, 600, and 1000 yards away. Hit

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\* Since distance to tumble is extremely sensitive to bullet yaw at impact, to be valid such tests must use large sample sizes of completely representative weapons and ammunition fired at many increments of range (since yaw is somewhat random from round to round and can vary rapidly with range). Few, if any, gelatin block tests meet these criteria of validity; a common failing is to simulate long-range impacts by using down-loaded cartridges at short range, which gives invalid yaw results.

\*\* Ballistic Research Laboratories, Ballistic Limits of Tissue and Clothing, by J. Sperrazza and W. Kokinakis, BRL TN 1645, AD 813-139 (Aberdeen Proving Ground, MD, January 1967).

\*\*\* U.S. War Department, Pig Board, Report of the Board of Officers Appointed by Paragraph 31, Special Orders 154, War Department, 2 July 1928 (Washington, September 21, 1928).

locations and directions were controlled; armor plate with a small aperture at the desired impact location was placed in front of each pig. The residual velocities and yaw of exiting bullets (almost all rounds completely penetrated the pigs) were measured in many cases. Wounds were examined and measured through autopsy.

#### Reanalysis of Pig Board Results

Examination of the wound-by-wound data in the pig test report reveals some clear lethality results that do not appear to be generally understood today; no newer or more valid data exist to refute them. Of a total of 106 wounds, 86 percent were described (based on the autopsy results) as producing severe damage. The remaining 14 percent were from shots that penetrated only skin, fat, and muscle; 80 percent of these hit the thighs, back, and shoulders. Most of these shots hit near the edges of the pig's silhouette.

The reanalysis confirmed the original report's findings of some differences among wounds from the different caliber bullets, with the smallest bullets producing the greatest damage at ranges of 300 and 600 yards. However, the larger bullets also produced severe damage at these ranges. The only detectable reduction in severity of damage at 1000 yards relative to damage at the shorter ranges was in wounds in the hams (thighs), some of which were probably not immediately incapacitating.

The amounts of bullet energy transferred to the pigs were measured in some of the shots, primarily those fired at 600 and 1000 yards. Foot-pounds of energy transferred ranged from 12 to over 1100, but over 60 percent of the bullets deposited less than 300 foot-pounds of energy (each) in the pigs' bodies. Contrary to the assumptions of most predictive models, total energy\* deposited in the non-serious wounds had about the

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\*The physics of wound damage (i.e., the diameter of the temporary cavity) is concerned with the instantaneous space rate of energy loss, not the total energy loss. As mentioned above, the diameter of the temporary cavity is proportional to the projectile energy times the retardation coefficient at the point in the body where the cavity diameter is measured. The diameter of the cavity varies radically along the wound track, depending mostly on instantaneous bullet yaw angle and tissue resistance at each point.

same distribution as in the serious wounds. The only apparent difference in the amounts of energy deposited by the .256, .276, and .30 caliber rounds was that only the .30 caliber bullet deposited more than 700 foot-pounds. Energy transfer was somewhat a function of the hit location, with hits in the head, chest, and abdomen accounting for the great preponderance of energy deposits larger than 200 foot-pounds. Average total energy transfer was greater at 600 than at 1000 yards, reflecting the greater kinetic energy remaining in the bullets at the shorter range. However, as stated above, this did not appear to affect the percent of serious wounds produced.

It appears that most of the tested combinations of bullet size, range (and thus bullet velocity), and hit location and direction are above any minimum threshold for serious wounds. Of these factors only hit location and direction significantly influenced the seriousness of the wounds inflicted by these bullets.

#### Reanalysis of Goat Tests

Wound ballistic tests were conducted on goats in 1964;\* they were less precisely controlled than the pig tests. The weapons used were the 5.56-mm M16 rifle (1 in 12 twist); the 7.62-mm M14 rifle; and the Soviet 7.62-mm AK 47 rifle (representing considerably lower bullet mass and velocity than the M14). The locations of hits and directions of bullet paths relative to the goats were not controlled, but most bullets hit the goats' torsos rather than their extremities, and apparently from the side. The wounds were examined by autopsy. Of a total of 182 hits, 45 percent put the goat on the ground--dead or unable to stand--within five minutes (usually in a few seconds). In another 43 percent of the hits the goats were either sacrificed before five minutes elapsed or the time to their collapse was not recorded; however, the descriptions of the wounds (including diagrams of the wound tracks) indicate that they were serious.

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\*Edgewood Arsenal, Chemical Research and Development Laboratories, Wound-Ballistics Assessment of M-14, AR-15 and Soviet AK Rifles (U), by Arthur J. Dziemian and Alfred G. Oliver, CRDLR 3204, AD 366-278 (Edgewood Arsenal, MD, March 1964), Confidential/NOFORN.

Many of this latter group of wounds produced large cavities in the goats' gastrointestinal systems. Thus, 85 percent of all wounds were apparently serious ones. The remaining 15 percent of the hits caused skin, fat, and muscle damage that would not necessarily be severe. Given the high variability induced by uncontrolled hit locations, all of the bullet types tested produced similar proportions of serious wounds at all ranges; differences in their lethalties cannot be inferred from the data.

#### GELATIN TESTS AND PREDICTIVE MODELS BASED ON THEM

Gelatin blocks are the most widely used target substitutes for human bodies in lethality testing because the tests are inexpensive and a detailed photographic record can be obtained of the projectile's track through the gelatin. The results of these tests are not, however, reliable indicators of lethality.\* In addition to the unrepresentative homogeneity of the gelatin target, the permanent cavity in gelatin is only a record of tumbling; it does not represent the size of the temporary cavity in tissue, which is the basic damage mechanism in human bodies.

Attempts have been made to compensate for the artificiality of gelatin block results. In current computer models for predicting incapacitation, the projectile's total energy loss in 15 cm of gelatin is calculated from equations fitted to the previously described gelatin block firings and then translated into estimated wounding effects of such incapacitation "scores"\*\* as a function of gelatin energy loss in each area of the body hit. The overall result is averaged, using the assumption of uniformly random horizontal hits or a standing nude man (with helmet) to arrive at

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\* A detailed discussion of the technical aspects of the use of gelatin data to predict lethality is contained in U.S. Army, Small Arms Weapon Systems Analysis--a Review and Evaluation (Washington, June 1967).

\*\* These "scores" are intended to be percent reductions in soldier "capability" for each area of the body, arrived at by a panel of medical doctors using subjective judgments. Separate "scores" versus energy loss, by area of the body, were established for the various incapacitation criteria such as the "5-minute defense" criterion and the "30-second attack" criterion. Defenders and attackers are both assumed to be full standing figures.

an average incapacitation "score" (often incorrectly used as an incapacitation probability). It is claimed that the basic incapacitation "score" judgments were based on the kinds of wounds that were observed in goats hit with spheres or cubes at various total energy loss levels. Even if goat wounds could be validly translated into human wounds, the shape of the wound track and temporary cavity made by spheres and cubes is quite different from that made by bullets, since bullet tumbling carries great variations in cavity diameter. Further, the goat tests provided too small a sample size to determine the chances that hits on given areas of the goat's body would fracture bones, rupture intestines, or damage vital organs and veins.

The results of these incapacitation models have been calculated a number of times over the past fourteen years for the current standard small arms projectiles--the M80, 7.62 mm NATO; the Soviet AK47, 7.62 mm (39-mm cartridge); and the M193, 5.56 mm. The numbers always decrease substantially as range increases from 100 to 500 meters. The more recent calculations\* show the 5.56-mm and 7.62-mm bullets as achieving essentially equal average incapacitation "scores" at 100 meters (i.e., about .85 to .90 incapacitation), but as range increases to 500 meters the 7.62 mm decreases slowly to .77 incapacitation, while the 5.56 mm bullet drops to a .50-.55 "score."

These prediction differences are the direct results of calculated, not tested, differences in bullet energy loss to gelatin blocks during the first 15 cm of penetration. These calculated energy losses decrease smoothly\*\* from 1400 foot-pounds at 10 meters' range to 150 foot-pounds at 500 meters' range for the M80, 7.62-mm bullet, and from 700 to 57 foot-pounds over the same ranges for the M193, 5.56-mm bullet. If there were a valid basis for relating the energy loss in 15 centimeters of gelatin to wound severity and incapacitation, the above energy losses should approximate

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\* Edgewood Arsenal, Chemical Research and Development Laboratories, Wound-Ballistics Assessment of M-14, AR-15 and Soviet AK Rifles (U), by Arthur J. Dziemian and Alfred G. Oliver, CRDLR 3204, AD 366-278 (Edgewood Arsenal, MD, March 1964), Confidential/NOFORN.

\*\* Valid test values of energy loss would show some increases with range at certain range intervals, due to increasing bullet yaw over these intervals.

those of the Pig Board tests. In fact, at 600 yards the measured losses in .30 caliber bullet energy due to travel through the pigs' bodies were more than four times larger than the calculated gelatin energy loss for the 7.62 mm (which has about the same size bullet and 100 fps more muzzle velocity than the Pig Board .30 caliber). The mean energy transfer in pigs at 600 yards for the .256 caliber bullet (2700 fps muzzle velocity) was 413 foot-pounds, and for the .276 and .30 caliber bullets (same velocity) it was 611 foot-pounds; median energy transfer values were 452 and 534 foot-pounds, respectively.

Clearly, gelatin block data and computer translations thereof cannot provide valid estimates of relative or absolute bullet lethality. The pig tests may imply lower wound severity than might be expected in actual combat. No clothing or equipment covered the pigs, so there were none of the added tipping effects on the bullets--increasing the wounding effect--that such materials could impart.\*

#### CONCLUSIONS

There is evidence from both combat data for the 6.5-mm Japanese bullet and animal tests for high-velocity (i.e., above 2400 fps) bullets ranging from 5.56 mm to 7.62 mm that approximately 85 percent of the wounds resulting from hits by such bullets will be serious, that is, will require hospitalization rather than care at battalion aid stations. What percent of these serious casualties will be effectively incapacitated under any time criterion is unknown and unprovable. The performances of these bullets are more than adequately lethal and appear to be well above some as yet unidentified threshold of lethality. Differences in the size

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\*Tests conducted with thin metal tipping plates showed that causing 7.62-mm bullets to tip before striking a body produced what were described as "gross wounds." Ballistic Research Laboratories, Comparative Effectiveness Evaluation of the M14 and Other Rifle Concepts (U), by Robert E. Carn, Joseph Sperrazza, and Ronald L. Simmons, Technical Note 1482, AD 359-241 (Aberdeen Proving Ground, MD, December 1962), Confidential.

of the temporary cavity and the wound track caused by these bullets may exist, though the variability of the available data and the dominant importance of wound track location make it impossible to produce reliable evidence of significant differences.

On the basis of the surgical observations above, it appears that lower-velocity bullets (300 to 1200 fps), such as are used in pistols and submachine guns, produce considerably less severe wound damage.

Gelatin block tests, if sufficiently carefully conducted, can provide reliable measurements of relative distance to tumble, a useful qualitative indicator of relative lethality. Currently available gelatin block tests do not generally meet the criteria for reliable measurements.

It is apparent that predictions of bullet energy loss in gelatin, and current computer models that predict average incapacitation "scores" from these energy losses, are based upon tenuous assumptions and do not agree, in absolute or relative magnitude, with animal test results or combat experience data. Few animal tests of bullet lethality exist; none since the 1928 Pig Board have reached the same level of scientific validity.

These conclusions imply that if small arms projectiles are to be used that differ markedly in velocity or shape from current standard rifle and machine gun bullets, new animal testing will probably be necessary. Such tests should use the Pig Board procedures as a pattern, together with the other considerations mentioned in this appendix.

## Appendix C

### ENGINEERING TEST FORMAT

This appendix provides a typical example of the content of a small arms engineering test. The test cited is a standard engineering test for lightweight automatic rifles, and its procedures have remained approximately the same for the last twenty years.\* Because of their stability of content, such tests provide a source of data for engineering comparisons of weapons developed at different times.

The instrumentation needed to conduct engineering tests is not extensive. If diagnostic tests are done to investigate or amplify basic engineering tests results, as sometimes occurs, instrumentation is needed for making detailed measurements of component pressures, loads, and motions (e.g., chamber pressures, buffer forces, and bolt accelerations). This instrumentation is the same as that used in small arms engineering design testing; it is not as extensive as the test equipment needed for other types of weapons in development.

The sample engineering test format presented in the annex to this appendix is taken directly from a 1960 Development and Proof Services test of the AR-15 rifle.\*\* Since then, the engineering and testing of the lightweight automatic rifle have changed very little if at all.

It should be noted that absolute thresholds of acceptable performance are rarely specified for each of the 11 test procedures. In particular, no thresholds are usually set for assembly/disassembly, accuracy, flash, or

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\*The test cited is not significantly different from tests that the Springfield Armory and Development and Proof Services, Aberdeen Proving Ground, were administering in the early 1950s. Springfield Armory, Synopsis of the Results of Tests of the U.S. Rifle, Caliber .30 Lightweight, T47, for the Period Covering 1 Jul 51 - 30 Jan 52, by S. D. Caloccia, SA-MR11-2500 (Springfield, MA, April 7, 1952).

\*\*Development and Proof Services, A Test of Rifle, Caliber .223, AR-15, by L. F. Moore, DPS-96, AD 245-705L (Aberdeen Proving Ground, November 1960).

cook-off. At most, performance in these tests is subjectively (but rarely explicitly) compared with that of previous rifles. Furthermore, few if any rifles--including those later standardized--pass all the extreme condition endurance tests.

ANNEX TO APPENDIX C

ENGINEERING TEST FORMAT FOR A  
STANDARD LIGHT AUTOMATIC RIFLE TEST

TEST I: EXAMINATION

- a. The rifle will be disassembled and an examination made of all parts.
- b. The number and names of all parts and the types of springs will be recorded.
- c. The weight of the complete rifle, component parts and accessories will be recorded.
- d. The length of the rifle and other pertinent dimensions will be recorded. Dimensions recorded will include barrel length, sight radius, line of sight above bore, and stock dimensions.
- e. The average trigger pull will be determined.
- f. The rifle will be photographed in various conditions of disassembly.

TEST II: DISASSEMBLY AND ASSEMBLY

The time, and the number and type of tools required for each of the following operations will be recorded:

- a. To disassemble the rifle completely.
- b. To assemble the rifle after complete disassembly.
- c. To dismount the operating parts and magazine mechanism (field strip).
- d. To assemble the operating parts and magazine mechanism.

TEST III: ACCURACY

- a. Four ten-round targets will be fired at a range of 100 yards from a machine rest or from a bench rest by an expert rifleman.
- b. A test will be conducted to investigate the accuracy that can be obtained when the rifle is fired under various conditions similar to those encountered in combat. Three riflemen will each fire the following course at 100 yards with the test rifle:

(1) With sights properly adjusted and with a fouled bore,\* one 10-round target will be fired from a bench rest.

(2) The rifle will be disassembled (field stripped), cleaned, oiled, and reassembled.

(3) Starting with a cold and oiled bore, one 10-round target will be fired from a bench rest.

(4) One 10-round target will be fired from the prone position using a sling.

(5) One hundred rounds will be fired as rapidly as possible.

(6) Immediately after firing the 100 rounds, one 10-round target will be fired from a bench rest.

(7) Another 10-round target will be fired immediately from the prone position using a sling.

c. Three riflemen will each fire 10 three-round bursts at a range of 25 yards from the standing position. The course will be repeated from the prone position. A suitable control rifle may be used.

d. Three individuals will fire as many aimed shots as possible in a one-minute period with each semiautomatic and automatic fire. The course will be fired three times per individual and the hits recorded on the E\*\* target at 100 yards.

e. Six individuals will fire a standard qualification course with the rifle.

#### TEST IV: ENDURANCE

The rifle will be fired 6000 rounds for endurance, firing alternately 100 rounds semiautomatically and 100 rounds automatically. The rifle will be cooled after each 100 rounds. The entire mechanism may be disassembled, cleaned, and oiled after each 600 rounds. All malfunctions, breakages, and replacement of parts will be recorded. The instrumental velocity will be measured on 20 rounds, before and after the endurance test. Accuracy will be checked before and after the test. In the endurance test, 100 rounds will be fired semiautomatically and 100 rounds will be fired automatically under each of the following conditions:

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\*How the bore is fouled is not specified.

\*\*The "E" target is a silhouette target corresponding to a kneeling man. U.S. Army, U.S. Rifle Caliber .30, M1, FM 23-5, (Washington, May 1965).

- a. With the rifle held loosely in the hands.
- b. With the rifle held right side up.
- c. With the rifle held left side up.
- d. With the rifle held loosely in the hands at an elevation of 80 degrees.
- e. With the rifle held in a normal manner at an elevation of 80 degrees.
- f. With the rifle held loosely in the hands at a depression of 80 degrees.
- g. With the rifle held in a normal manner at a depression of 80 degrees.

TEST V: FLASH

The cumulative flash from 20 rounds fired semiautomatically in a completely dark range will be recorded photographically by means of a 4- by 5-inch camera using a lens opening of f/2.5 and a film having a Weston rating of 100. The camera will be placed at a right angle to the muzzle at a distance of 4.5 feet.

TEST VI: UNLUBRICATED

The rifle will be cleaned in solvent and left in an unlubricated condition. One hundred rounds will then be fired alternating between semiautomatic and automatic fire.

TEST VII: EXTREME COLD

The rifle will be cleaned, lightly oiled, and placed with a loaded magazine in a cold room maintained at -65°F, for a 12-hour period prior to firing. After this period an attempt will be made to fire 20 rounds (or the capacity of the magazine) semiautomatically. If satisfactory functioning is obtained, a similar number of rounds will be fired automatically after an additional two hours.

TEST VIII: DUST

The rifle will be cleaned, lightly oiled. It will be fully loaded and the safety will be placed in the "ON" position. The rifle will then

be placed in the dust box and exposed to the dust for one minute top side up and for one minute upside down. The dust mixture, which is made by mixing nine pounds of Grace O Albany sand with one pound of clean silica core sand which passed 100 percent through a 30-mesh sieve, 80 percent through a 50-mesh, and 3.4 percent through a 100-mesh, will be poured at a rate of five pounds per minute through the pourhole while the blower is turned at a handle speed of 60 revolutions per minute. The shooter will attempt to clean the rifle by wiping with his bare hands and by blowing sharply on the congested areas of the action. An attempt will be made to fire 20 rounds (or the capacity of the magazine).

#### TEST IX: MUD

The rifle will be cleaned, lightly oiled, and the muzzle taped to exclude the mud from the bore. The rifle will be immersed completely in the mud for a period of 15 seconds. The mud mixture is made in the proportion of ten pounds of red clay and two pounds of clean river sand to eight quarts of water. The sand is approximately the same grading as that used in the dust test. The shooter will remove the tape from the muzzle and attempt to clean the rifle by wiping with his bare hands and by blowing on the congested areas of the action. An attempt will be made to fire 20 rounds (or the capacity of the magazine).

#### TEST X: RAIN

The rifle will be cleaned, lubricated, and subjected to spray directed over the entire rifle by means of a 1/2-inch pipe having 0.059-inch holes spaced 1/2 inch apart. The pipe will be positioned three feet above the rifle. The following procedure will be used:

- a. The rifle, in a horizontal position, will be exposed to the spray for five minutes with the bolt retracted and for five minutes with the bolt closed. The rifle will be loaded when the bolt is closed. After this time the gun will be fired 100 rounds semiautomatically.
- b. The procedure in "a" will be repeated, except that the gun will be fired automatically.
- c. The procedure in "a" will be repeated, except that the rifle will be exposed to the spray with muzzle up. The rifle will be fired 100 rounds semiautomatically in a horizontal position. Before firing, the muzzle of the rifle will be depressed to permit water accumulating in the bore to run out.
- d. The procedure in "c" will be repeated except that the gun will be fired automatically.
- e. The procedure in "c" will be repeated except that the rifle will be exposed to the spray with muzzle down.
- f. The procedure in "e" will be repeated.

TEST XI: COOK-OFF

The rifle will be subjected to a test to determine the minimum number of rounds which may be fired before sufficient heating of the chamber occurs to result in a premature explosion of the cartridge. The firing will be conducted as rapidly as possible employing preloaded magazines. An attempt will be made to bracket the cook-off point in number of rounds fired.

## Appendix D

### RANGES AT WHICH SMALL ARMS TARGETS ARE ENGAGED

#### INTRODUCTION

This appendix briefly reviews the available information on the ranges at which small arms are used in combat. Target range frequency--the frequency of use versus range--is important for both the design and testing of small arms.

For testing purposes, the effectiveness of weapons cannot be usefully compared or evaluated without a realistic estimate of the ranges at which they are likely to be fired. For design purposes, requirements emphasize ranges that are too long. The design will be forced toward a heavier weapon and heavier ammunition of higher recoil, which can result in lower lethality, lower sustainability, and lower target effects against personnel targets at the ranges actually encountered in combat.

The question addressed here is what ranges are "normal" in small arms combat and what ranges occur too infrequently to be of interest.

The available quantitative data on small arms targets consist of fragmentary estimates of ranges and exposure times. These data do not define the frequency of target existence, detection, engagement, and exposure time as a function of range, tactical situation, terrain, and light; they merely reduce the degree of uncertainty about these matters. Some data on combat target range frequency are available for the following four types of targets:

- o Targets in line of sight to a firer, though concealed or partially concealed.
- o Targets in line of sight that are detected and recognized as targets (whether accurately located or not).
- o Recognized or acquired targets that are fired upon, i.e., engaged.
- o Engaged targets that are hit.

The available data for each of these types are discussed below.

#### MAXIMUM RANGES AT WHICH TARGETS ARE IN LINE OF SIGHT

Two sets of data are available that provide estimates of line of sight ranges to small arms targets. Both indicate upper-bound or maximum ranges at which lines of sight to targets may exist, but neither indicates how often targets will actually be in line of sight at any range within these maximum ranges (or how often the targets will be detected).

The first set is drawn from a study of World War II combat actions in the Ardennes campaign, December 1944. It gives the maximum ranges that could be seen along approaches to 153 company-level U.S. and German defensive positions (determined by personal reconnaissance of each defensive position).<sup>\*</sup> Thus, these data present the approximate ranges beyond which line of sight could not have existed--the actual lines of sight from firers to targets in these battles would necessarily have been shorter. Figure D-1 shows a frequency distribution of these ranges. When a position was attacked at night, the line-of-sight range was assumed to be reduced to less than 100 meters. That assumption partially accounts for the high incidence of short ranges in a terrain with much open area (the sample covered all terrain in the Ardennes campaign, only a small portion of which was heavily forested).

The other data set is the results of an analysis of combat and terrain data by combat-experienced analysts.<sup>\*\*</sup> The analysis was

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<sup>\*</sup> RMC Research Corporation, Research Study on Predictive War Game Factors; Final Report, by James K. Cockrell and Donn Carter, prepared for SHAPE Technical Centre, Contract C.72-03 (Bethesda, MD, March 1974).

<sup>\*\*</sup> Stanford Research Institute, Considerations Affecting the Doctrine of Small Arms Employment Rifle and Automatic Rifle Usage as a Function of Range (U), by George M. Gividen, prepared for U.S. Army Combat Developments Command Experimentation Center (Ft. Ord, CA, February 1965), Confidential.

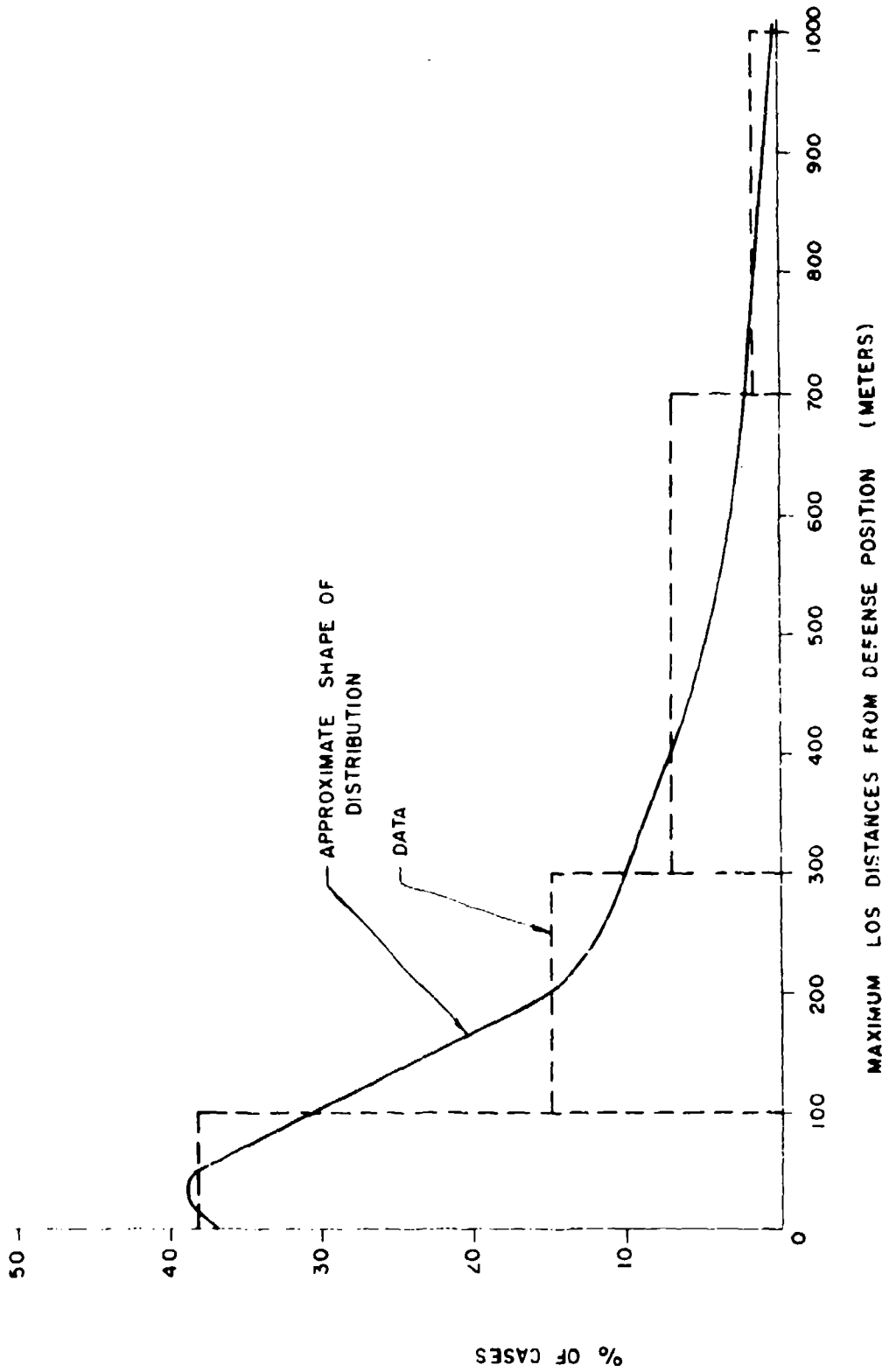


Figure D-1. Frequency distribution of maximum lines of sight ranges from 153 defense positions in the Ardennes Campaign, World War II.

conducted by the experimentation team at the U.S. Army Combat Developments Command Experimentation Center, which planned and conducted the Small Arms Weapon Systems experiment in 1965-1966.\* The team reviewed and compared available sources on small infantry unit combat experience and doctrine, and then translated their findings into sets of target arrays, on actual terrain, that were thought to represent typical firer-target dispositions in each of four typical kinds of infantry engagements (assault, advance and encounter, fire support of assault, and prepared defense). The frequency distribution of line-of-sight ranges to these targets for each type of engagement are illustrative, though they do not constitute definitive combat target range frequencies. They can be considered high or upper-bound estimates because the terrain was selected to bias the supporting fire positions toward ranges somewhat longer than typical combat ranges. That was done to test fully the range-accuracy capabilities of each of the candidate small arms tested in the experiment. The frequency distributions of range to targets are shown in Figures D-2 (rifle squad targets) and D-3 (machine gun squad targets).

#### RANGES AT WHICH PERSONNEL TARGETS ARE DETECTED AND RECOGNIZED

##### Absence of Measurement

Very little even quasi-quantitative data are available on the ranges at which personnel targets are detected and recognized, probably because the interacting factors affecting detection vary so widely; they include level and angle of light, vegetation, camouflage, and target exposure time and movement. It is obvious that a man walking erect in an open, grassy meadow in the daytime will be seen by almost all observers at considerable range and that a stationary man who is partially concealed in foliage at night may not be seen at even a few meters. Regrettably, the effects of the variations between such extremes have rarely been measured.

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\*U.S. Army Combat Developments Command, Experimentation Command, Small Arms Weapon Systems (SAWS), Part 1: Main Text, CDCEC 65-4 (Ft. Ord, CA, 10 May 1966); U.S. Army Combat Developments Command, Experimentation Command, Small Arms Weapon Systems (SAWS), Part 2: Annexes, CDCEC 65-4 (Ft. Ord, CA, 10 May 1966).

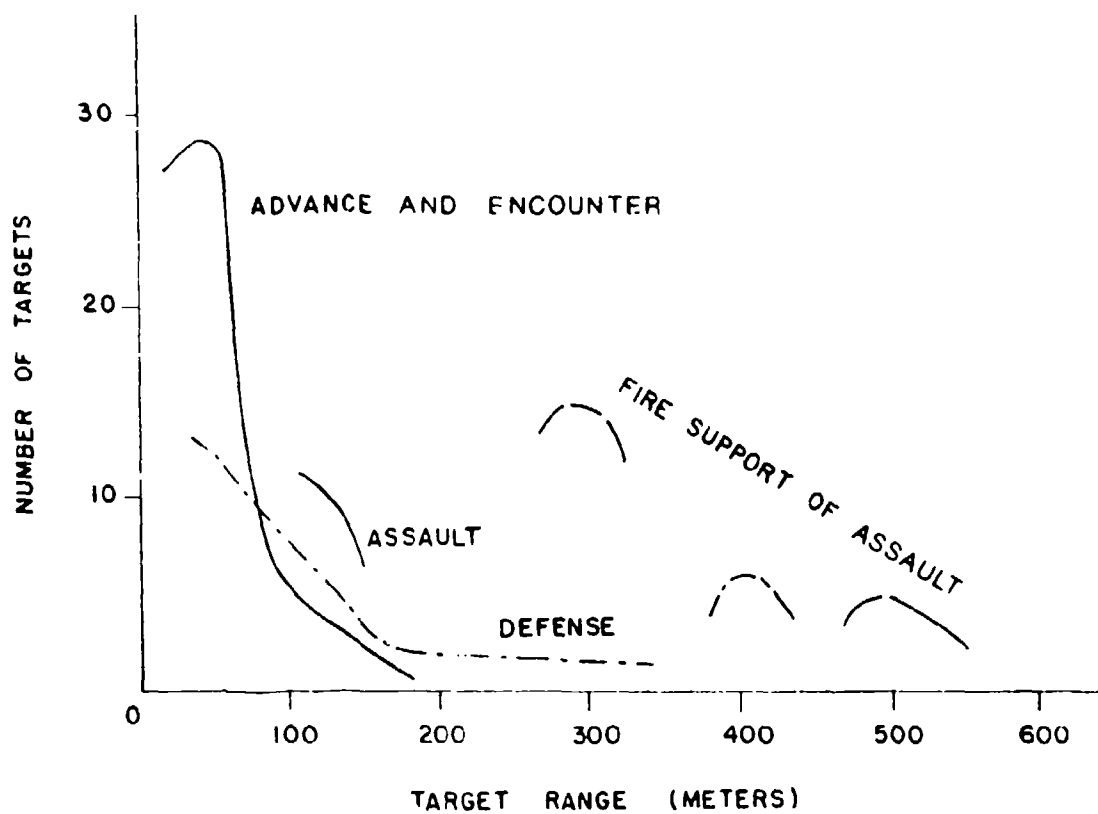


Figure D-2. Frequency distribution of ranges to rifle squad targets in the CDEC-SAWS experiment.

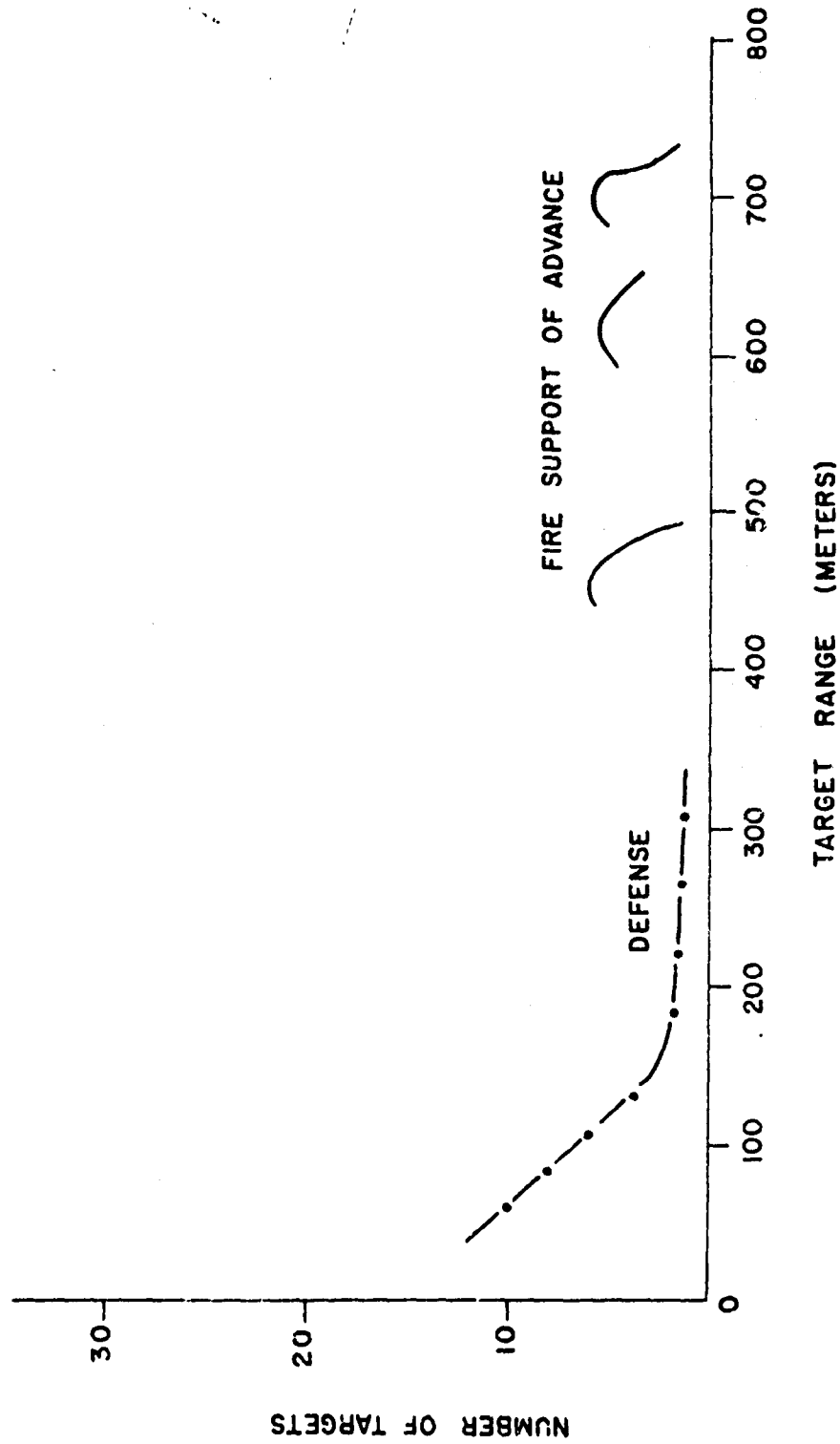


Figure D-3. Frequency distribution of ranges to machine gun squad targets in the CDEC-SAWS experiment.

One of the few experiments on this subject only confirmed the obvious conclusion that moving, standing personnel are readily detectable up to 300 meters (the longest range tested) unless concealed by vegetation; the experiment found no consistent effects of motion.\*

#### CDEC-SAWS Target Detection Evidence

Detection of stationary personnel in defensive positions is certainly much more difficult, and the CDEC-SAWS experiment provided some useful insights into this question. Targets that were silhouettes of soldiers' heads and shoulders were quickly raised at various ranges (to represent a man rising up in a foxhole), and colocated devices simulated the flash, smoke, and sound of small arms and the dust kicked up by muzzle gases.

Most of the CDEC-SAWS targets were partially concealed in a realistic manner. It was found that neither the targets nor the general locations of arrays containing them could be detected at ranges of about 500 meters or more, even when the weapon simulations were made more perceptible than was considered representative of combat conditions. The areas in which these target arrays were located had to be pointed out to test subjects to enable them to place fire on the arrays. Even when the targets were placed at 250-350 meters, the low percentages that were hit by the nearly 1000 test subjects provided evidence that their exact locations were difficult to detect.

#### Night Target Detections

The ranges at which targets can be detected for small arms fire in night combat vary greatly, exceeding daytime ranges at one extreme (e.g., machine gun muzzle flash on a clear night) and approaching point-blank range at the other (e.g., stealthy approach in woods on an overcast night). Observations and interviews with soldiers recently exposed to combat in the Korean War produced estimates of approximate infantry target-detection

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\*Human Resources Research Organization, Target Detection and Range Estimation, by James A. Caviness, Jeffery L. Maxey, and James H. McPherson, Technical Report 72-34, AD 753-600 (Alexandria, VA, November 1972).

ranges comparing day and night conditions.\* The combat infantrymen's judgments of the range intervals within which most targets were detected are listed in Table D-1.

Table D-1

RANGE INTERVALS FOR DETECTING INFANTRY  
TARGETS REPORTED FROM THE KOREAN WAR

| <u>Range (meters)</u> | <u>Condition</u>        |
|-----------------------|-------------------------|
| 15-200 .....          | All cases               |
| 15-150 .....          | Attacking targets       |
| 50-200 .....          | Day only                |
| 15-50 .....           | Night only              |
| 15-30 .....           | Night or cut-up terrain |

RANGES AT WHICH PERSONNEL TARGETS ARE FIRED UPON

The ranges at which small arms fire is directed at personnel may be somewhat shorter than those at which targets are detected and recognized. Fire will sometimes be withheld to permit targets to close to shorter ranges, to increase the chance that they will be hit before they take cover, or for other reasons. Two kinds of quantitative data are available about the distributions of firing ranges in combat: questionnaires and combat films.

Range Estimates from Questionnaires

One type of firing range data is the result of surveys of combat-experienced personnel made some time after the experiences occurred. Two such surveys made by the Johns Hopkins University Operations Research

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\* Johns Hopkins University, Operations Research Office, Commentary on Infantry Operations and Weapons Usage in Korea; Winter of 1950-51, by S. L. A. Marshall, ORO-R-13, AD 000-342 (Chevy Chase, MD, October 1952).

Office contain responses about percentages of rifle fire expended at various ranges. (The basis of ammunition expenditure is likely to skew the underlying distribution of range, though the direction of bias is unknown.) One survey dealt only with daytime firing in the Korean War; the other dealt with firing under all visibility conditions in World War II (Europe and the Pacific) and the Korean War.\*

Figure D-4 shows the results of the surveys. As might be expected, firing during daytime in the Korean War showed a rather high incidence of targets at 150-300 meters.

#### Range Estimates from Combat Films

The second type of combat data consists of estimates of firing ranges derived from films of rifle, carbine, automatic rifle, and light machine gun firings in World War II and the Korean and Vietnam wars. Estimates could be made of firer-to-target range in 780 of a total of 1429 samples of combat movie film sequences of small arms firings (see Appendix E for detailed description). It appears from the overall film content that many short-range conditions typical of intense combat--such as final assaults or defenses against them--are rare. Figure D-5 shows the frequency distribution of firing ranges in the total sample, which contains 138 film sequences of firings in World War II in Europe, 211 sequences in World War II in the Pacific, 65 sequences in the Korean War, and 364 sequences in the Vietnam War. Figure D-6 shows the frequency distribution of filmed firings of rifles and M60 machine guns in Vietnam combat, and Figure D-7 shows the frequency distribution of firings of rifles, BARs, and carbines in World War II in Europe.

From observations and postbattle interviews of Korean War infantrymen have come general statements about firing ranges that support the data

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\*Respectively, Johns Hopkins University, Operations Research Office, Use of Infantry Weapons and Equipment in Korea, by G. N. Donovan, Technical Memorandum ORO-T-18(FEC), ATI 169-243 (Chevy Chase, MD, 13 May 1952), and Johns Hopkins University, Operations Research Office, Tactics Division, SALVO I: Rifle Field Experiment, by Leon Feldman et al., Technical Memorandum ORO-T-378, AD 304-321 (Bethesda, MD, June 1959).

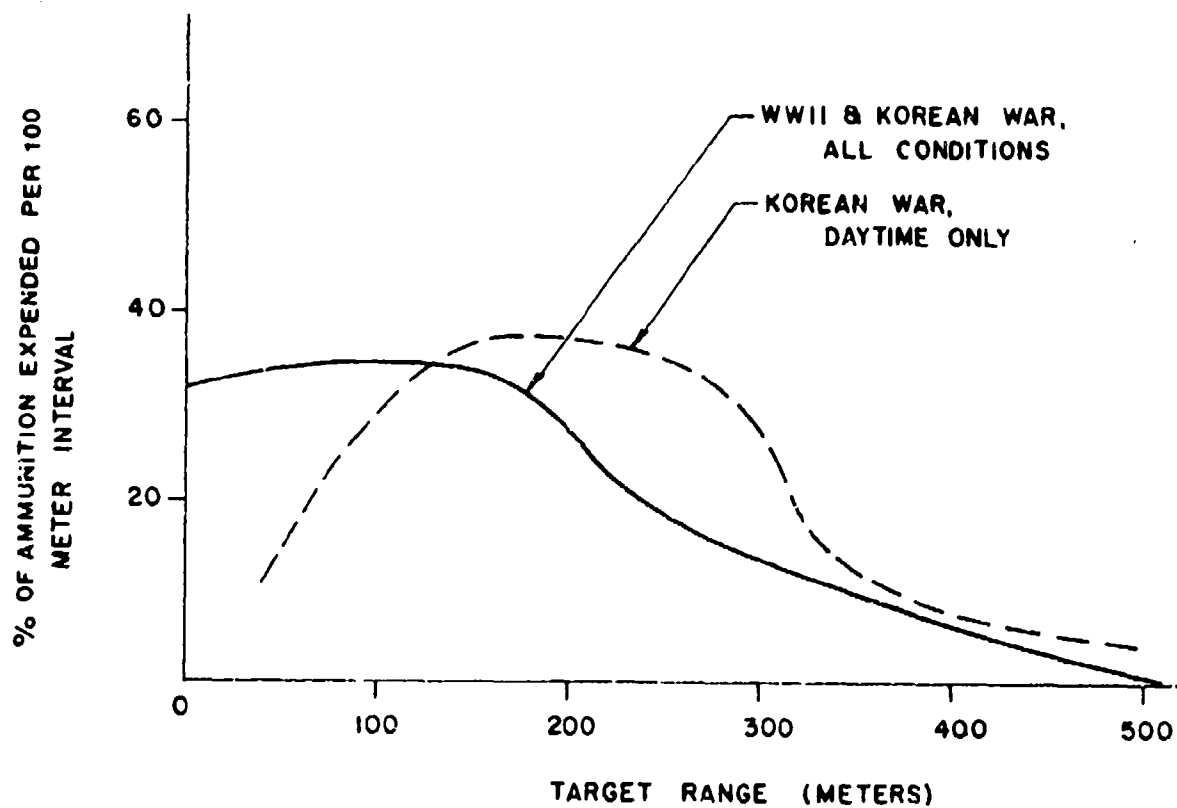


Figure D-4. Percent of rifle ammunition expended versus range in World War II and the Korean War.

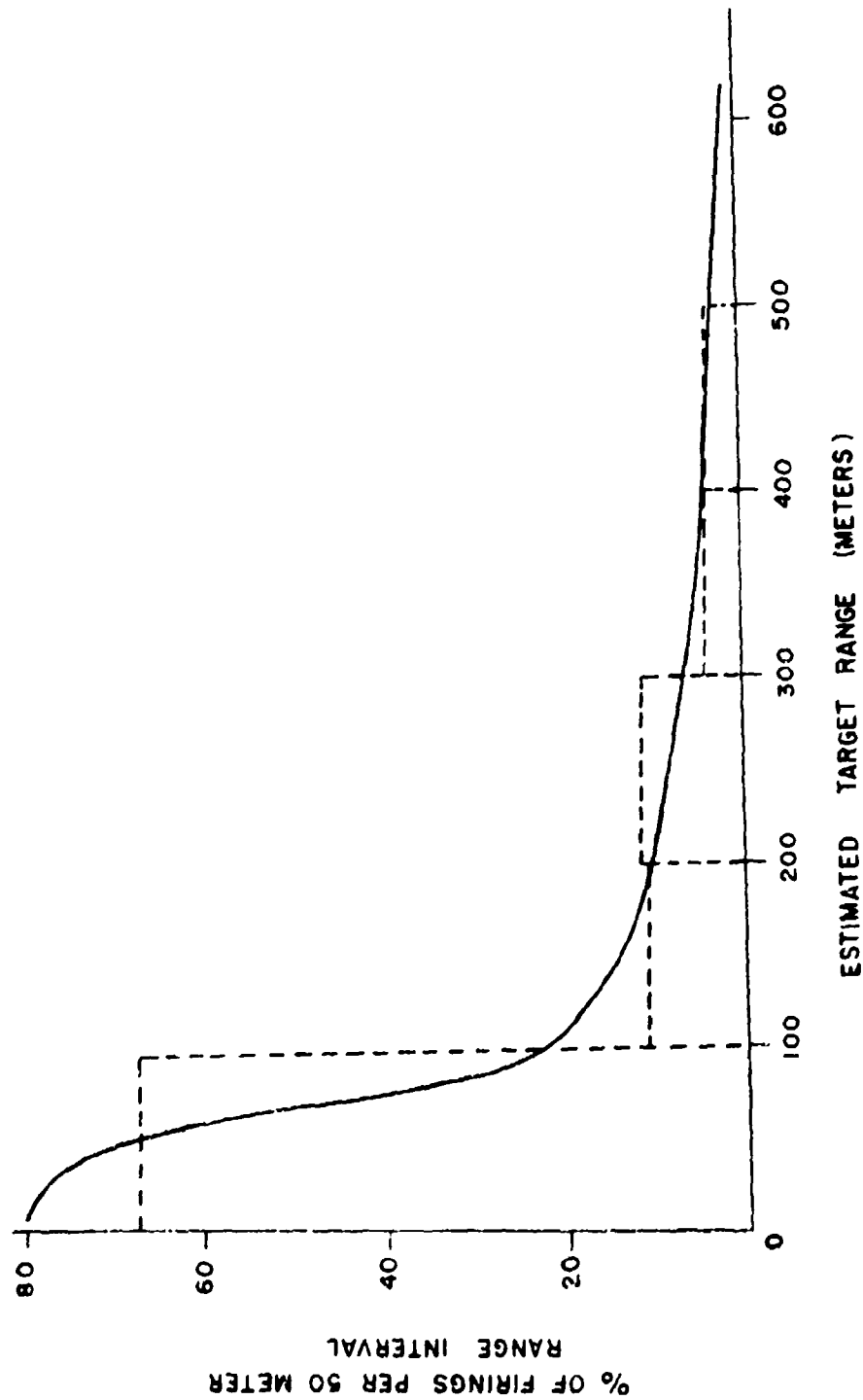


Figure D-5. Frequency distribution of ranges in small arms firings estimated from World War II, Korean War, and Vietnam War combat film.

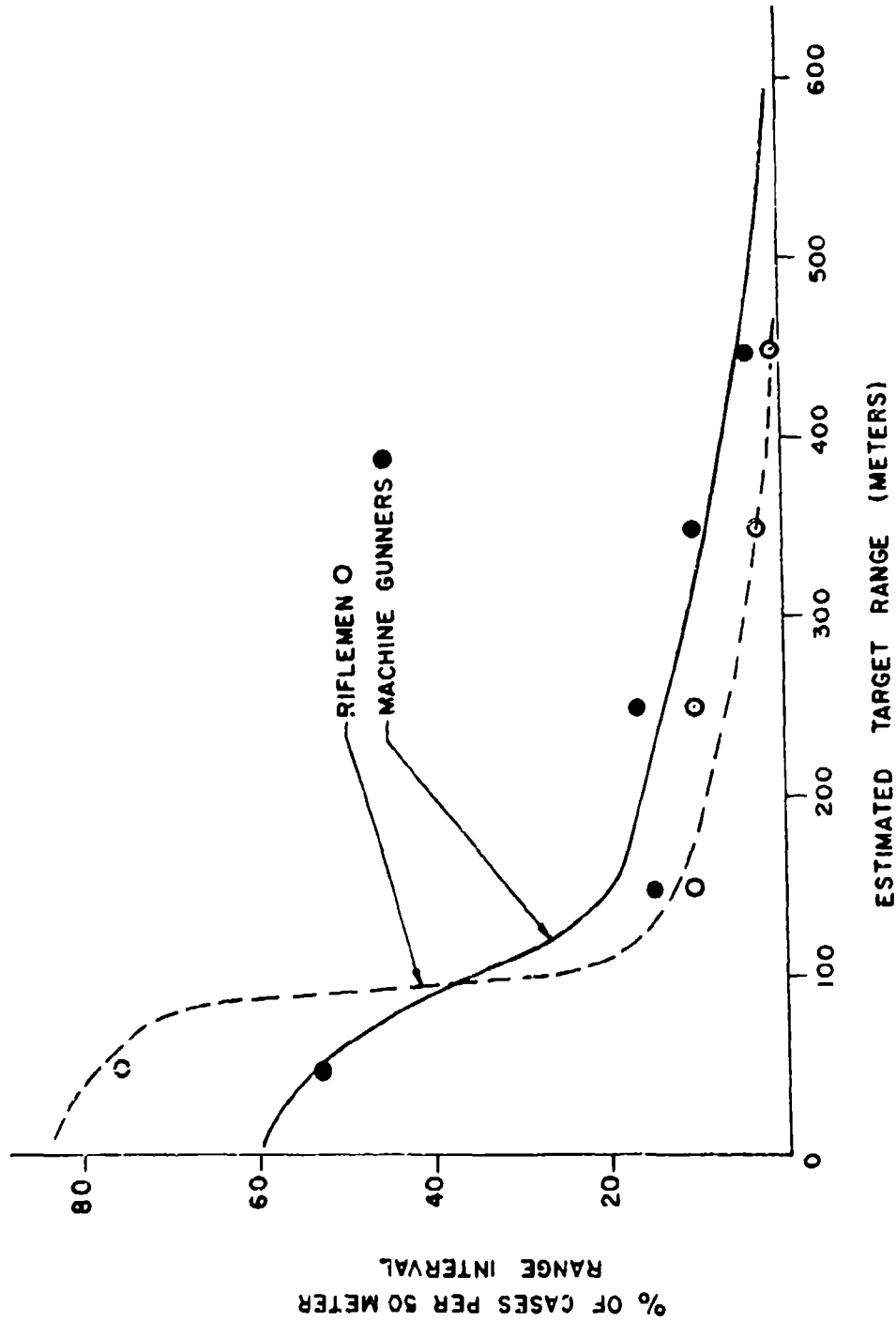


Figure D-6. Frequency distribution of ranges in small arms firings estimated from Vietnam War combat film.

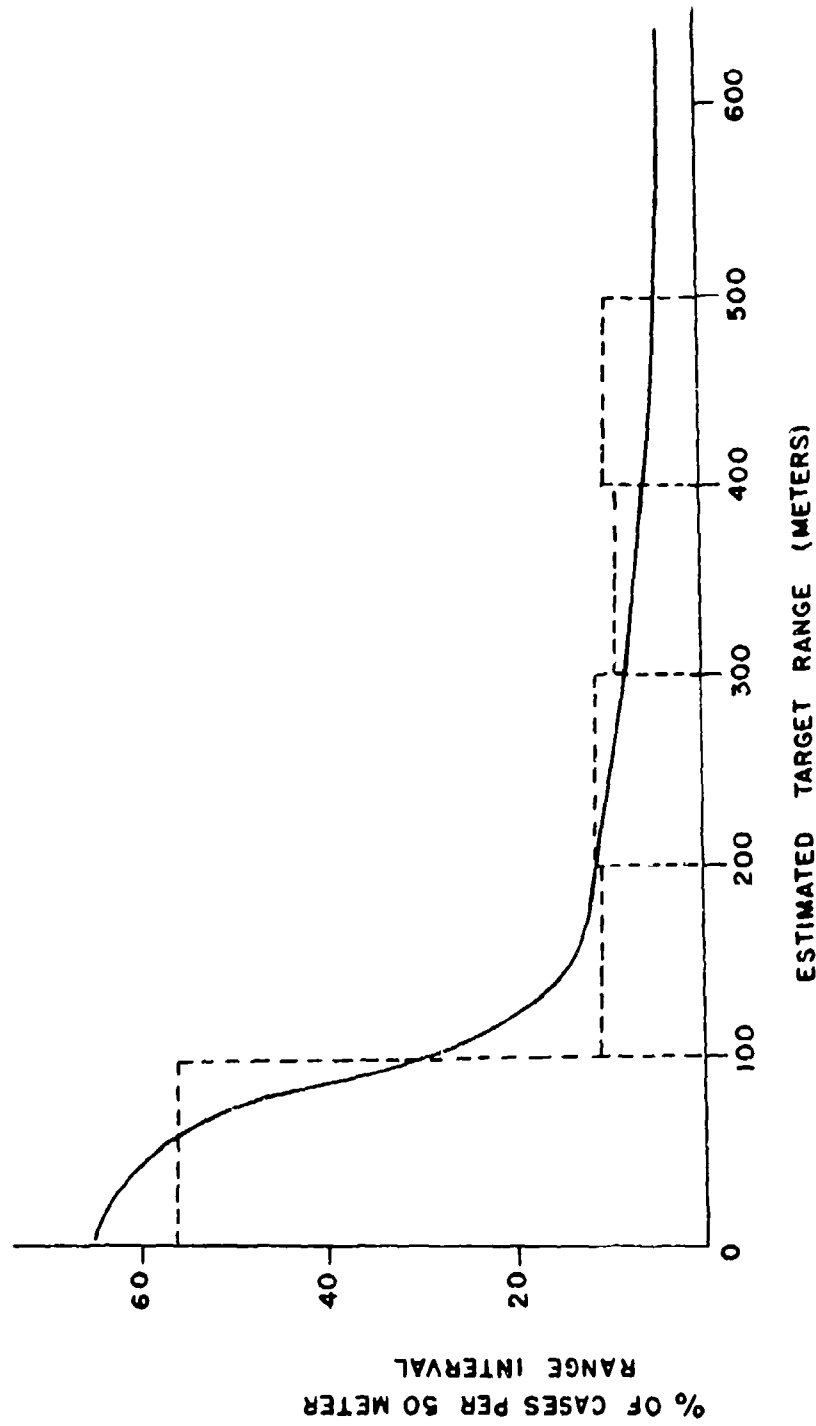


Figure D-7. Frequency distribution of ranges in small arms firings in World War II in Europe.

described above.\* They indicate the ranges shown in Table D-2.

Table D-2

ESTIMATED MAXIMUM USEFUL SMALL ARMS RANGES  
IN THE KOREAN WAR

| <u>Range (meters)</u> | <u>Condition</u>                                            |
|-----------------------|-------------------------------------------------------------|
| Up to 400 .....       | All rifle squad fire                                        |
| About 300 .....       | "Normal" maximum for BAR fire                               |
| About 200 .....       | "Effective" range for small arms fire                       |
| About 150 .....       | Maximum for decisive small arms fire repulsion of attack    |
| Up to 50 .....        | Usual range for engaging Chinese Communist attacking forces |

A British Army study has concluded that the ranges at which British units fired in the Korean War and the ranges at which targets become available to small arms firers in tactical training exercises are consistent with each other.\*\* The former is represented by the curve in Figure D-8. Although the trench warfare of World War I was certainly different from combat in World War II and later wars, a study of infantry actions in World War I determined that riflemen rarely fire at ranges greater than 400 yards.

RANGES AT WHICH SOLDIERS ARE WOUNDED  
OR KILLED BY BULLETS

Another type of combat data helpful in estimating ranges at which rifles and machine guns are used in combat is the frequency distribution

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\* Johns Hopkins University, Operations Research Office, Commentary on Infantry Operations and Weapons Usage.

\*\* Great Britain, Jungle Warfare School, Trial and Development Wing, Trial of Section 5.56mm Light Machine Guns, by M. W. Ward, JWS/TD/STO/2 (N.p., 8 July 1970).

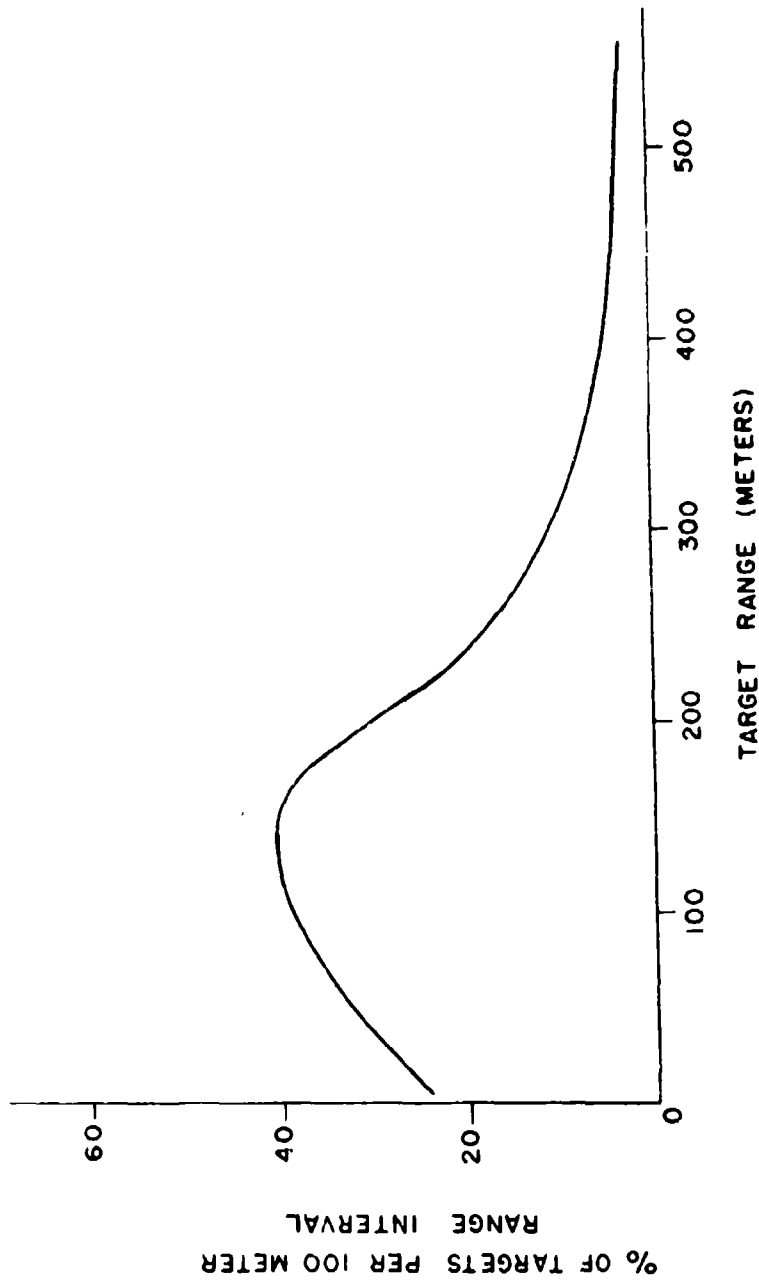


Figure D-8. Frequency distribution of ranges in small arms firings estimated by the British Army for combat in Korea.

of ranges at which bullet wounds are received. These ranges are necessarily shorter--probably significantly shorter--than a distribution of firing ranges. Data on this subject are not normally collected during combat, but a few samples exist.

Firing ranges at which casualties were hit were estimated on 208 of 219 casualties of small arms fire who were handled by one battalion medical aid station during campaigns in New Georgia Island and Burma in World War II. Of the 208 casualties (WIA and KIA), 93 were reportedly hit by rifle bullets and 115 by machine gun bullets; 68 percent of the rifle bullets and 65 percent of the machine gun bullets were estimated to have been fired from ranges of less than 75 yards (the range distribution of longer-range firings was not given). Figure D-9 shows the distribution of casualty ranges for these data, as calculated directly from the compiled incident descriptions.\*

A similar sample was collected in the Bougainville campaign, in which there were 549 bullet casualties; range estimates could be made on 460 of these (339 from rifle fire and 121 from machine gun fire).\*\* The range-limiting effect of jungle terrain appears to be more pronounced in this campaign, because 80 percent of the rifle bullet casualties and 86 percent of the machine gun casualties occurred at ranges of less than 75 yards.

Firing range data on one sample of surviving casualties from the Turkish Brigade in the Korean War suggest a type of terrain very different from that of the preceding samples.\*\*\* Of the 257 bullet wounds sustained, 149 were reportedly from rifles, 59 from machine guns, 28 from pistols or submachine guns, and 21 from unidentified weapons. No distribution of ranges is available, but the soldiers themselves estimated an average wounding range of 112 meters for rifle bullet wounds and 71 meters for machine gun bullets. As in the data from the Pacific theater

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\*U.S. Army, Office of the Surgeon General, Wound Ballistics, edited by James C. Beyer (Washington, 1962), p. 272.

\*\*Ibid., p. 421.

\*\*\*Ibid., p. 716.

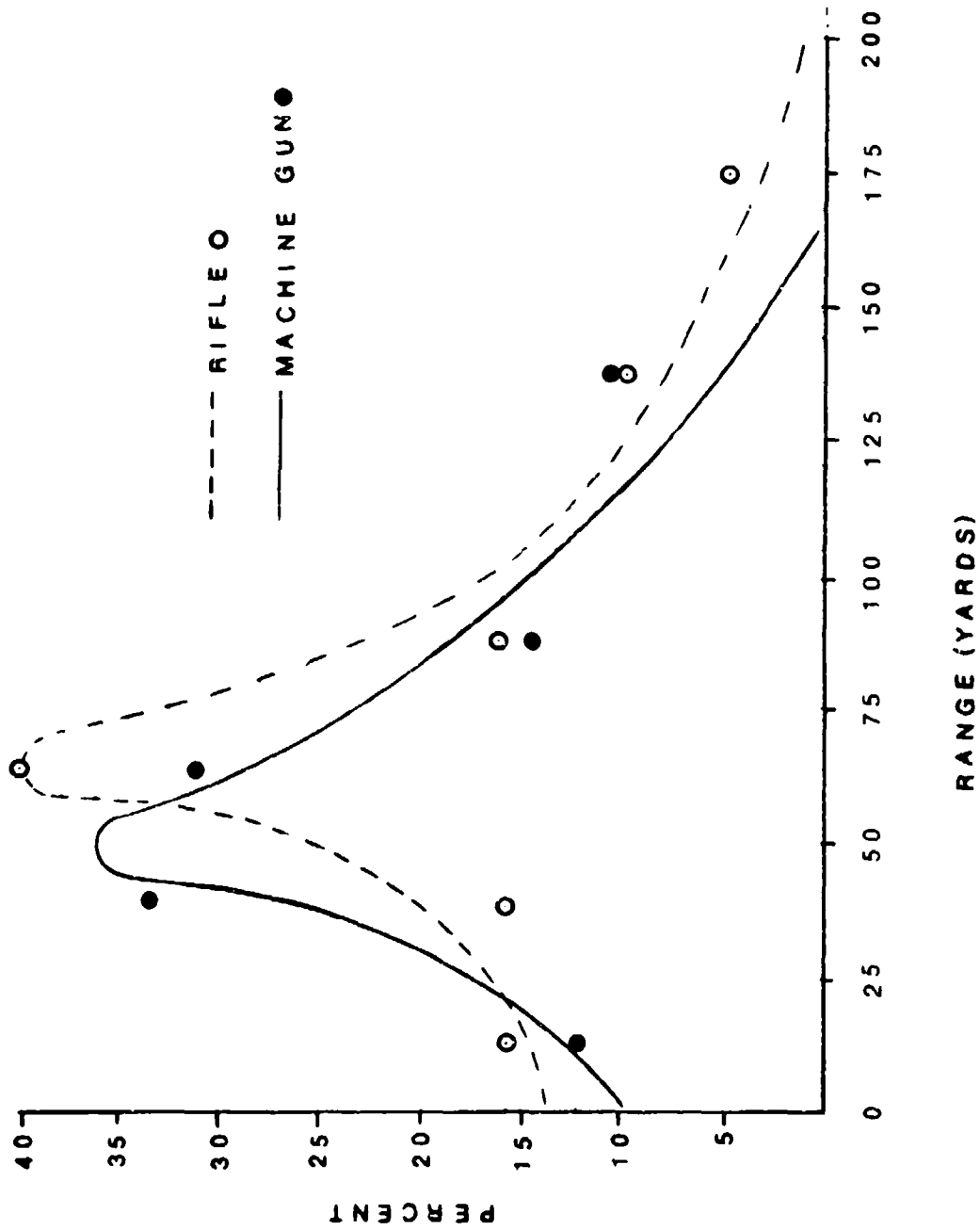


Figure D-9. Frequency distribution of ranges at which small arms casualties were incurred in New Georgia and Burma in World War II.

in World War II, machine guns had casualty-producing ranges consistently shorter than those of rifles.

A much larger sample of bullet casualty ranges is available from the Vietnam War, from surveys made by the U.S. Army Wound Data and Munitions Effectiveness Team in 1967.\* Of 4980 casualty cases considered, range data are available on 991 rifle fire wounds. The distribution of these ranges is shown in Figure D-10; note that the average range is 73 meters, compared with the Turkish Brigade average of 71 meters for machine guns and 112 meters for rifle bullets.

The apparently longer average casualty ranges in Korea may owe partially to the longer lines of sight on the Korean terrain, but they may also reflect a bias in the Turkish soldiers' estimations. Their range figures were apparently not checked by other estimates, as were most of the data in the other samples.

#### ASSESSMENT

The data presented above do not permit precise identification of the target range frequencies for small arms. Considering the variety of sources, however, the data are quite consistent in showing that the bulk of small arms combat takes place at under 100 meters, and a negligible percent of firings or casualties takes place beyond 300 meters.

There is little evidence that machine guns fire at significantly greater ranges than do rifles; machine gun-inflicted casualties consistently occur at ranges shorter than rifle-inflicted casualties. This probably reflects (1) a high percentage of machine-gun use in defensive or unplanned attacks, and (2) the frequent difficulty of finding positions from which long-range fire support can be delivered, coupled with uncertainty about the defender's location and the difficulty of coordinating such fire with the attacker's movement.

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\*U.S. Army, Materiel Systems Analysis Agency, Comparison of Predicted and Observed Wound Ballistics Estimates for Rifle Bullets (U), by Robert E. Carn et al., Technical Report 28 (Aberdeen Proving Ground, MD, November 1970), Confidential.

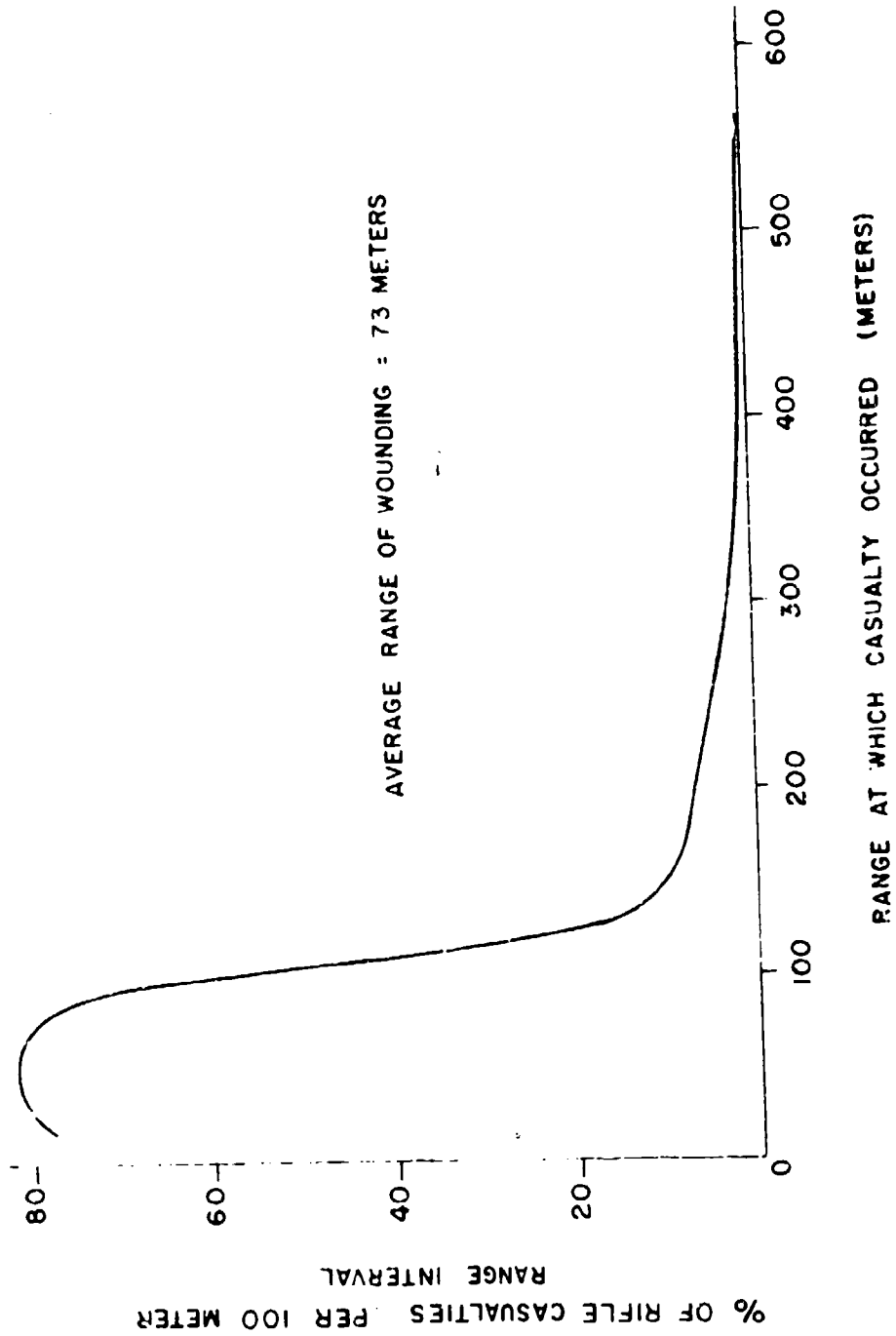


Figure D-10. Frequency distribution of ranges at which U.S. rifle casualties were incurred in the Vietnam War.

## Appendix E

### HOW SOLDIERS FIRE SMALL ARMS IN COMBAT-- ANALYSIS OF COMBAT FILMS

This appendix presents the results of an examination of combat films of small arms firing in World War II, Korea, and Vietnam. The examination was undertaken to derive insights regarding combat firings that might be of use in testing small arms. The appendix has eight sections: the reasons for using combat photography, the usefulness of the data collected from it, body positions, body exposure, aiming techniques, firing speed, target range, and a comparison of the body positions actually taken by the firers with those they had been taught in training. The data collected are presented in an annex to this appendix.

#### WHY COMBAT PHOTOGRAPHY WAS USED

Chapter III noted the importance of simulating the combat context in small arms operational tests. Actual combat is two-sided, so the firers on each side are also targets for the other side. The danger from return fire cannot be simulated in testing, although other aspects of two-sided firing situations can be simulated. Realistic testing will attempt to ensure that firer conduct in small arms tests will be like that in combat, but little data for comparing the two has been available.

A type of data that may be potentially useful in judging the impact of actual combat on firers--and the extent to which combat firing differs from test firing--is combat photography. An extensive amount of infantry combat film is available in Army and Marine Corps archives. On the other hand, film data have severe limitations that must be recognized.

#### USEFULNESS OF DATA FROM COMBAT FILMS

The utility of combat photography as a data source for improving the realism of small arms effectiveness testing hinges on three negative aspects

of the combat photography mission. First, the combat photographer is not permitted to impede or compromise the combat action being filmed, so his pictures are real, not staged.\* Second, combat photographers are not expected to take unreasonable risks in becoming casualties. It is likely, therefore, that they get a considerably smaller than representative sample of film footage in combat situations that place them in great danger, such as final assaults on well-defended enemy positions or defenses against very strong attacks. However, from examination of the films they took and the fact that many of them became casualties, it is clear that combat photographers operated in many sharply contested infantry actions. Third, the inherent limitations of the film medium (limited field of view, light dependence, lack of depth perception) and the frequent failure of cameramen to photograph target areas restrict the type and amount of information that combat films contain.

Another set of limitations is not specific to combat photography; it is the inherent weakness of any sample of descriptions of individual actions in combat. They lack extensive details about the individual and the engagement--details such as his skills, the level and content of his training, the combat circumstances of enemy and friendly tactics, and so forth. It becomes almost impossible to assess whether a certain individual action reflects good or poor training, effective or ineffective technique, fatigue or alertness.

However, even though combat film is a limited source of information on combat behavior, it may contain some useful information on firing positions, firing time factors, aiming techniques, and possibly target ranges. As regards the combat films examined for this study, little information was available on the circumstances of each photographed firing; and the representativeness of the sample of firings recorded on the film cannot be established in any quantitative way. With the foregoing limitations in mind, the following sections discuss observations derived from combat films that bear on small arms effectiveness testing.

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\*Careful scrutiny of each "combat" film identified a few reenactments or staged events. No data were collected from these films.

### CONTENT OF THE FILM DATA

To collect information about small arms firings from combat film for this study, all the film footage contained in the U.S. Army Motion Picture Depository at Tobyhanna, Pennsylvania, and in the U.S. Marine Corps Motion Picture Archives at Quantico, Virginia, was viewed. Over 800 reels of film were found to contain potentially useful small arms firing sequences, and the 61,000 feet of film in these reels were searched. In them, 1429 usable firing sequences were discovered. Each was screened by trained and combat-experienced observers, who reduced the desired data from each sequence into a format suitable for computer processing.

The readily derived information from combat films that is of potential relevance to small arms testing is firer posture, body exposure during firing, sighting techniques (aiming or pointing), rate of fire and burst size, and target ranges. The films were searched for a number of other data items of potential interest, but it was discovered that they could not be collected from the films or were insignificant.

Detailed descriptions of each element of information that was collected appear in the annex to this appendix. It also describes the procedures used to classify or measure each element and gives a complete listing of the data collected for each firing sequence.

### OBSERVATIONS ON BODY POSITIONS

The body positions from which soldiers fire small arms may be influenced by a number of factors. They include the combat mission, whether or not the soldiers are moving or stationary, what cover and concealment are available, how the terrain and vegetation affect their opportunity to see and point at the target area, the apparent danger presented by enemy fire of all types, what weapon they are using, and their firing doctrine.

It was not possible to collect information on all these factors from the films, so the proportions of times that soldiers fired from standing, kneeling, prone, foxhole, or other positions cannot be related to all the factors that presumably influenced the selection of those positions.

Table E-1 shows the frequency of occurrence of each position. In the possibly biased film sample, a strong preference is shown for standing (weapon at shoulder or underarm) and kneeling positions. The standing or kneeling position was used about 65 to 80 percent of the time with every weapon, including the heavy BAR and M60 automatic weapons. The M60, however, was fired almost twice as often from the prone position as the other weapons--about 30 percent of the M60 firings were prone. The prone, sitting, and squatting positions combined comprised 26 to 28 percent of the positions taken with the heavier rifles and the BAR, but only 18 to 20 percent of those taken with the lighter and shorter carbine and M16 rifle.

Table E-1

INCIDENCE OF BODY POSITIONS IN FILMED SMALL ARMS  
FIRING SEQUENCES (%)

| Position                | Incidence of Position |     |     |     |         |     |                 |
|-------------------------|-----------------------|-----|-----|-----|---------|-----|-----------------|
|                         | All Weapons           | M1  | M14 | M16 | Carbine | BAR | M60 Machine Gun |
| Weapon at shoulder:     |                       |     |     |     |         |     |                 |
| Prone                   | 16                    | 17  | 12  | 10  | 8       | 16  | 29              |
| Sitting                 | 10                    | 11  | 14  | 8   | 9       | 9   | 6               |
| Squatting               | 1                     | 1   | 2   | 2   | 1       | 1   | 0               |
| Kneeling                | 28                    | 28  | 40  | 31  | 24      | 25  | 24              |
| Standing <sup>a</sup>   | 32                    | 36  | 19  | 32  | 46      | 37  | 14              |
| Weapon not at shoulder: |                       |     |     |     |         |     |                 |
| Standing or crouching   | 13                    | 7   | 13  | 17  | 12      | 12  | 27              |
| Total (%)               | 100                   | 100 | 100 | 100 | 100     | 100 | 100             |
| Total number of cases   | 1429                  | 531 | 133 | 319 | 89      | 180 | 177             |

<sup>a</sup>Includes less than 1 percent crouching.

Although the low incidence of prone firing (about 15 percent or less for rifles) may be due partly to a possible bias of the sample against the most intense combat situations, the films themselves show why the prone

position is so little used. In many film sequences, the firers would drop to the prone position upon receiving fire, and then would have to rise to a kneeling or sitting position to return fire, simply in order to see over the vegetation or cover directly in front of them. The films show clearly that there are few places where a firer can see much from a prone position.

Examination of the incidence of body positions in each of the various wars and theaters in which the weapons were used showed that they differed little from the overall incidence. However, when the body positions used by Army soldiers and Marines were compared, it is apparent that Marines fired the M1 and M14 rifles more often from the kneeling than from the standing position. The M14 sample shown in Table E-1 is primarily from Marine firings, which explains the higher percentage of the kneeling position in the M14 firings.

#### Sighting Methods versus Body Position

Sighting methods\* were affected by the type of body positions used. When the weapon was placed at the shoulder in a standing position, the sights were clearly not used over twice as much (7 percent of all standing position firings) as when the other shoulder-fired positions were used (3 percent of all prone, kneeling, etc., firings).

#### Type of Support Used

Another aspect of body position is the use of support for the weapon. Prone-position firing is always supported by the elbows resting on the ground, so it is not discussed further. The kneeling, sitting, and squatting positions usually involve resting one or both elbows on legs or knees. That was not considered in the data reduction as firm support; only when films showed firers resting their elbows or the weapon itself on a solid surface was it termed "support." Table E-2 shows that the incidence of use of support by firers of rifles, carbines, and the BAR in the shoulder-fired positions was about 20 to 28 percent, with 2/3 of the supported

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\*Sighting methods were not clearly distinguishable as aiming or pointing. The film allowed only a small proportion of the firing to be definitely identified as not using the sights; the aiming category probably includes a sizable proportion of pointing fire.

firings resting the weapon directly on the supporting surface. Only six of these firings were clearly pointed rather than aimed. There were only four cases of firing from a weapon's bipod for support (although they were available for many of the M16's and BARs), so they did not constitute 1 percent of any position and do not show up in the table.

Table E-2

INCIDENCE OF THE USE OF SUPPORT FOR RIFLES,  
CARBINES, AND BARs FIRED FROM THE SHOULDER

| Body Position        | Size of Sample | Type of Support on Solid Surface (%) |               |                 |       |
|----------------------|----------------|--------------------------------------|---------------|-----------------|-------|
|                      |                | Elbow                                | Weapon Itself | No Firm Support | Total |
| Standing             | 428            | 9                                    | 19            | 72              | 100   |
| Kneeling             | 365            | 5                                    | 15            | 80              | 100   |
| Sitting or Squatting | 144            | 13                                   | 13            | 74              | 100   |
| All Positions        | 937            | 8                                    | 17            | 75              | 100   |

OBSERVATIONS ON FIRER BODY EXPOSURE

Data were collected from each filmed firing sequence on the amount of each firer's body that was exposed in the direction toward which he was firing. These exposures were categorized as "full," "half," or "minimum." These terms mean that for each firing position (standing, prone, etc.), the full amount of a firer's body that could be exposed in that firing position was exposed, or that about half that amount was exposed, or that only a small fraction was exposed (generally little more than the head). Thus, a man in the prone position would be called "fully exposed" if no part of his body was obscured from enemy vision, even though his silhouette would be quite small. If he were lying in grass his exposure could be reduced to "half" or even "minimum" if he were partly behind a wall or foliage, etc.

The data show how often the firers attempted to remain partially or almost entirely concealed from the direction of the target areas. Table E-3 and Figure E-1 show the incidence of each exposure level (all firing positions combined) and the proportion of each that were clearly pointed or not. Clearly pointed fire was very strongly related to the degree of exposure: its use increased by half as exposure changed from minimum to full.

Table E-3

INCIDENCE OF FIRERS' BODY EXPOSURE LEVEL WITH  
SIGHTING METHOD AND SELECTED BODY POSITIONS

| Item                  | Body Exposure Level |          |          |            |
|-----------------------|---------------------|----------|----------|------------|
|                       | Full                | Half     | Minimum  | Total      |
|                       | No. (%)             | No. (%)  | No. (%)  | No. (%)    |
| Sighting method:      |                     |          |          |            |
| Clearly pointed fire  | 146 (25)            | 56 (21)  | 38 (7)   | 242 (17)   |
| Aimed or pointed fire | 439 (75)            | 214 (79) | 536 (93) | 1187 (83)  |
| Total                 | 585 (41)            | 270 (20) | 574 (39) | 1429 (100) |
| Body position:        |                     |          |          |            |
| Prone                 | 66 (29)             | 22 (10)  | 136 (61) | 224        |
| Standing              | 221 (50)            | 63 (14)  | 158 (36) | 442        |
| Not to shoulder       | 126 (66)            | 42 (22)  | 23 (12)  | 191        |

The incidence of each exposure level does not vary greatly across the different types of terrain or among the different weapon types, except that the firers of M60 machine guns (all in Vietnam) were fully exposed about 1/3 less often (27 percent of the time) and minimally exposed about 1/3 more often (51 percent) than were the firers of other weapons. The possible underrepresentation of intense combat in the film sample may cause these estimates of fully exposed firing frequency to be somewhat high.

Data were also collected on the proportion of partially exposed firers who were behind physical cover and who were behind nonprotective concealment only (grass, brush, etc.). Overall, about 40 percent of the firings

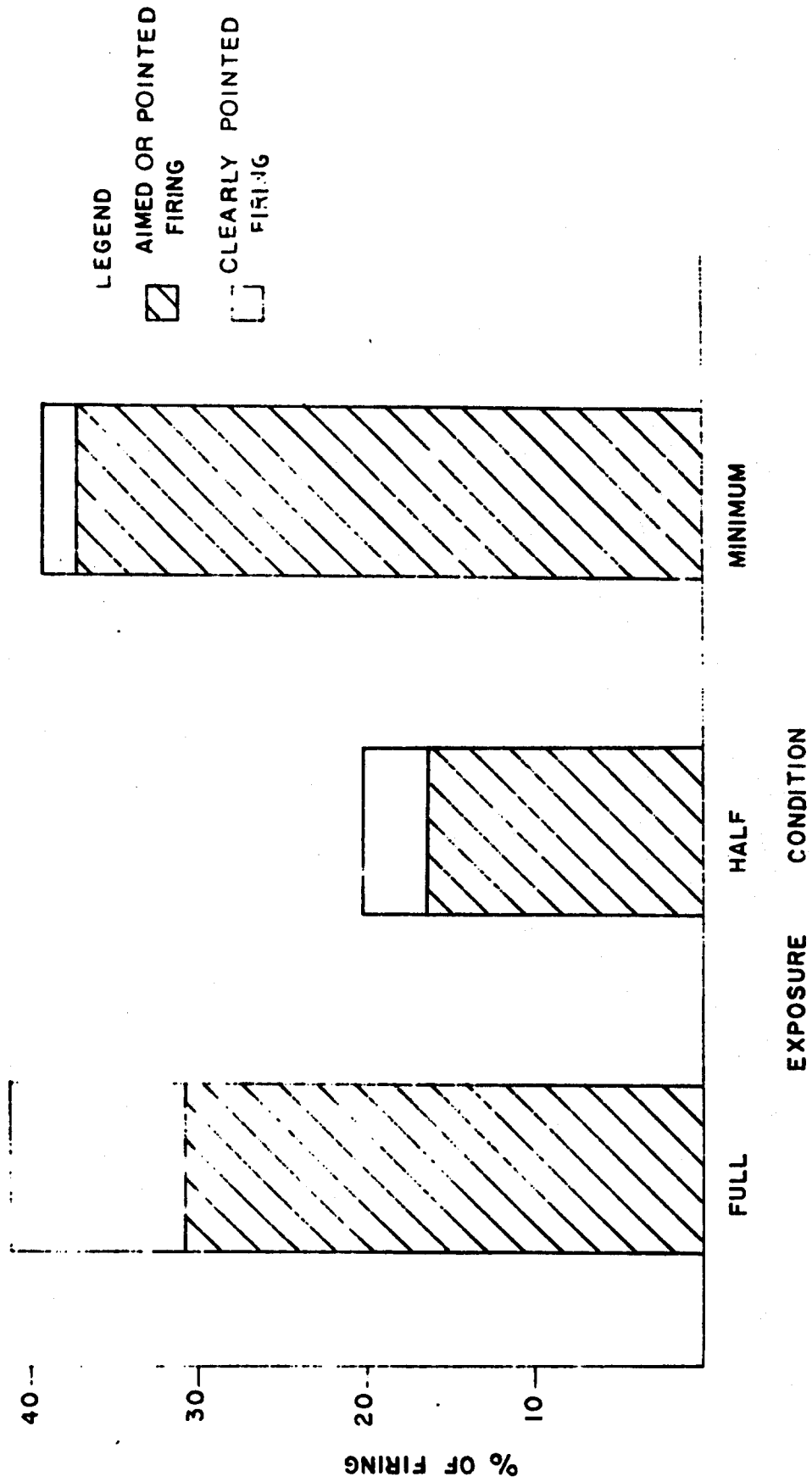


Figure E-1. Incidence of pointed and aimed fire at different exposure levels.

were fully exposed, and 40 percent were behind cover. Table E-4 shows the relative use of cover and concealment in different combat areas. The somewhat decreased frequency of fully exposed firings in Korea and Vietnam is noticeable; it may be due to changes in training rather than terrain since it happens in two theaters of rather different terrain. The only clear differences in the proportions among the different weapon types are those deriving from these theater differences (M14's, M16's, and M60's appeared only in Vietnam and the other weapons only in the other theaters).

Table E-4

INCIDENCE OF THE USE OF COVER AND CONCEALMENT  
BY SMALL ARMS FIRERS

| Item        | Use of Cover and Concealment in<br>Various Theaters (%) |                            |       |         |     | Size of<br>Sample |
|-------------|---------------------------------------------------------|----------------------------|-------|---------|-----|-------------------|
|             | Europe<br>(WWII)                                        | South<br>Pacific<br>(WWII) | Korea | Vietnam | All |                   |
| Cover       | 45                                                      | 42                         | 42    | 38      | 41  | 580               |
| Concealment | 8                                                       | 13                         | 20    | 24      | 18  | 264               |
| Neither     | 47                                                      | 45                         | 38    | 38      | 41  | 585               |
| Total       | 100                                                     | 100                        | 100   | 100     | 100 | 1429              |

OBSERVATIONS ON AIMING TECHNIQUES

All the weapons included in this data sample had conventional peep sights. In aimed fire, soldiers are taught to align the top of the front sight post or blade both on the target and in the center of the ring formed by the rear ring or "peep" sight. That takes time, so soldiers use pointed fire when they need to fire very quickly; it involves looking over, not through, the sights and "pointing" along the barrel. Examination of the film did not show the degree to which a soldier whose position apparently allowed him to look through his sights actually aligned them. It did,

however, permit identification of cases in which the firer could not have used his sights. There were 242 such cases; in 191 of them the weapon was fired from a hip or underarm position, and in 51 of them the weapon was at the shoulder but the firer's head was clearly above the axis of the sights. These cases were called "clearly pointed" fire; all others were called "aimed or pointed" fire.

If different weapon types are not "clearly pointed" and "aimed or pointed" with the same frequencies, it is possible that the difference is due to a difference in weapon characteristics. Characteristics that might produce such differences are the size or weight of the weapon, which affects its "feel" or handiness, and whether muzzle impulse is low enough to produce usable bursts of automatic fire that could offset the decreased accuracy of pointed fire.

When data on the incidence of aiming and pointing were examined, it was clear (from the M1, carbine, and BAR results in Europe and the Pacific) that the type of terrain in which the weapon was being used strongly influenced the soldier's selection of sighting method. Table E-5 illustrates the effect of terrain and of weapon types. It shows that shorter weapons and automatic-firing weapons were more often clearly pointed than were longer and semiautomatic weapons. This was especially true in terrain providing shorter firing ranges. The M60 machine gun's very high incidence of clearly pointed fire may be explained by the fact that in films of Vietnam fighting it appeared most often in advancing offensive operations and was often carried slung from the shoulder in a waist-high firing position. It should not be concluded from the table that the M16 is actually pointed less often than the M60--it is clearly pointed less often only because most M60 pointed firings are likely to be clearly pointed firings from the waist.

To the extent that the film sample is biased away from intense combat, the actual frequencies of pointed fire are probably higher than those shown here.

Table E-5

INCIDENCE OF CLEARLY POINTED FIRE BY WEAPON TYPE  
IN VARIOUS TERRAINS

| Weapon Type                     | Size of Sample<br>(Total Number of Firings) | Clearly Pointed Firings (%) |         |                       |
|---------------------------------|---------------------------------------------|-----------------------------|---------|-----------------------|
|                                 |                                             | Shorter-Range Terrain       |         | Longer-Range Terrain  |
|                                 |                                             | South Pacific (WWII)        | Vietnam | Europe (WWII) + Korea |
| Long, semiauto-matic rifle:     |                                             |                             |         |                       |
| M1                              | 531                                         | 12                          | --      | 7                     |
| M14                             | 133                                         | --                          | 14      | --                    |
| Short, semiauto-matic (carbine) | 89                                          | 22                          | --      | 10                    |
| Long, automatic:                |                                             |                             |         |                       |
| BAR                             | 180                                         | 22                          | --      | 4                     |
| M60 machine gun                 | 177                                         | --                          | 36      | --                    |
| Short, automatic:               |                                             |                             |         |                       |
| M16 rifle                       | 319                                         | --                          | 22      | --                    |
| All weapons                     | 1429                                        | 15                          | 24      | 7                     |

OBSERVATIONS ON FIRING SPEED

The amount of time firers take to aim or point their weapons at the target and to fire the first round (or burst) is of interest because it reflects the resolution of the conflicting pressures of need for accuracy (which motivates deliberate aiming) and need for speed (to beat the enemy's fire or reduce one's exposure). These times were measured from the moment that the weapon was placed in firing position (usually at the shoulder) to the moment of first trigger pull. The raw data are accurate to less

than 0.1 seconds but have been aggregated in 0.5-second intervals in Figure E-2. A smoothed curve has been added to show more clearly the approximate shape of the distribution of first-round firing times.

Figure E-3 shows the actual firing time distribution for clearly pointed fire and an estimated distribution for aimed fire that attempts to statistically remove the effect of the pointing fire cases that were indistinguishable photographically from aimed fire.\* The very short firing times for pointed fire (52 percent at less than .2 seconds) presumably reflects firer-inferred demands for extreme speed and go hand in hand with the firer's decision to point rather than aim. The median difference between clearly pointed and estimated aimed fire is about 1.2 seconds. The estimated distribution of aimed fire shows at least half the firings to be less than 1.4 seconds, considerably shorter than the generally accepted minimums of 1.5 to 2 seconds for aiming. This may reflect either a violation of the statistical assumptions underlying the estimating methods or a large proportion of firings somewhere between pointing and aiming.

It is interesting to compare the means of the distributions of firing times shown in Figure E-3 with the means of similar times measured in previous small arms tests. Mean times to first trigger pull (timed

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\*The estimated frequency distribution for aimed fire was calculated by (1) assuming that the aimed or pointed fire distribution was a weighted mixture of two distributions: the "pure" aimed fire distribution (unknown) and the "pure" pointed fire distribution (assumed equal to the actual clearly pointed fire distribution), (2) estimating the proportion,  $k$ , of "pure" pointed fire in the aimed or pointed sample, assuming that all the aimed or pointed firings at .2 seconds or less were, in fact, "pure" pointed firings, (3) applying the defining equation for mixtures of frequency distributions,

$$f_{\text{aim or point}} = kf_{\text{point}} + (1-k)f_{\text{aim}},$$

to "subtract out" the frequency distribution of "pure" pointed fire. Using that equation and the previous assumptions, the proportion,  $k$ , was calculated as the percent of all aimed or pointed firings that had firing times less than .2 seconds, divided by the percent of all clearly pointed firings that had firing times less than .2 seconds. Thus, the estimated proportion of "pure" pointed fire in the aimed or pointed sample was .17, or 17 percent.

from initial target appearance<sup>\*</sup>) are reported from the SALVO II experiment<sup>\*\*</sup> and two experiments conducted at Fort Benning, the Quick-Fire Experiment and the Defense Experiment.<sup>\*\*\*</sup> The SALVO and Quick-Fire times are almost identical, with average times to first trigger pull of 2.74 and 2.72 seconds, respectively. In the Defense Experiment, however, the average time to first trigger pull was 4 seconds at about 100 meters. In contrast, clearly pointed average times from the combat films are about 0.6 seconds, while aimed or pointed average firing times are about 1.6 seconds.

The reasons for the large differences between the mean values from the combat firings and those from the various tests appear to rest in firer motivation. Although the subjects in the SALVO and Quick-Fire experiments were instructed to fire quickly so as to get maximum hits, it appears that the experiments far from reproduced the time pressures of combat. The firers in the Defense Experiment were told to aim accurately so as to

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<sup>\*</sup>In the SALVO II and Defense experiments, the firers knew about where almost all the targets would appear; thus, time from target appearance to trigger pull would be slower than time from weapon positioning to trigger pull by only about .2 to .3 seconds.

<sup>\*\*</sup>Johns Hopkins University, Operations Research Office, Tactics Division, SALVO II: Rifle Field Experiment, by Leon Feldman et al., Technical Memorandum ORO-T-397, AD 325-385 (Bethesda, MD, May 1961).

<sup>\*\*\*</sup>Respectively, Litton Systems, Inc., Mellonics Systems Development Division, Infantry Weapons Test Methodology Study Quick-Fire Experiment I; Final Report, by Ronald D. Klein, Contract DAEA 18-68-C-0004, prepared for United States Army Infantry Board, USAIB Project 3091, AD 914-686L (Ft. Benning, GA, 27 June 1969), and U.S. Army Infantry Board, Defense Experiment I, TECOM Project 8-5-0070-01 (Ft. Benning, GA, 25 November 1971).

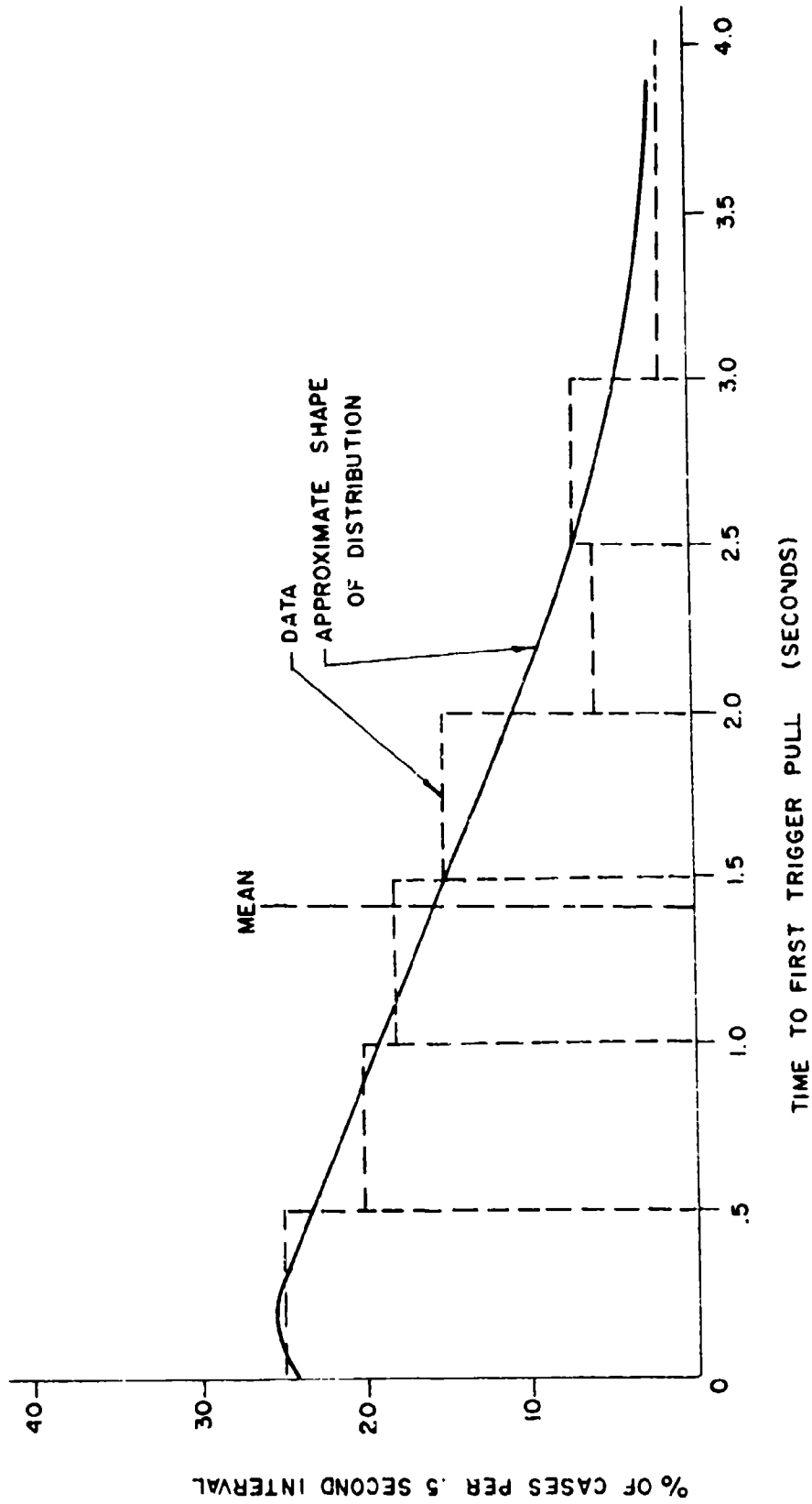


Figure E-2. Frequency distribution of first-round fire times.

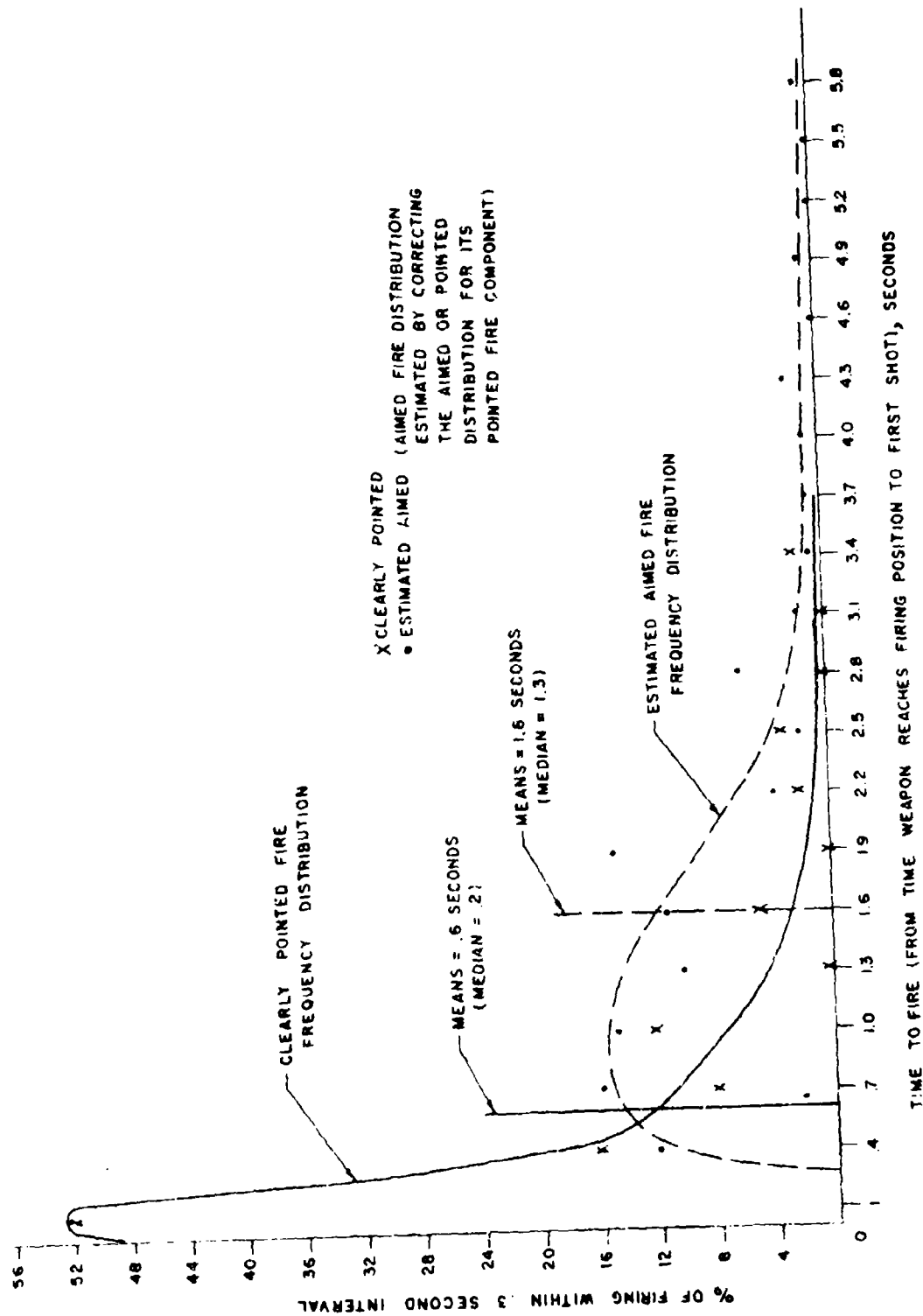


Figure E-3. Frequency distribution of first-round firing times for aimed and pointed fire.

maximize first-round hit probability and to expose themselves as little as possible while firing; as a consequence they took twice as long to fire as did firers in the other experiments and seven times as long as did those using clearly pointed fire in combat.

In all three experiments the firers were in position to fire before the targets were raised (and before time measurement began), and they roughly knew where to expect the targets to appear. In fact, in the Defense Experiment the firers had seen each group of four or five targets just before the same targets were exposed individually for them to engage. Thus, there is little reason to believe that the test firers were put at a time disadvantage to the combat firers (even though the experiment times are measured from target exposure, not from weapon in position). The combat firers had presumably already inferred or acquired a target before bringing the weapon to their shoulder. The shorter combat firing times probably reflect two factors: a stronger incentive to fire quickly, together with a greater willingness to aim less accurately, and the presence of few clearly defined targets to aim at.

It appears that the people who plan and conduct small arms tests can use measurements of test subjects' firing time (compared with the above combat firing times) to help assess whether the test subjects' training is achieving combat-like rapidity of fire. If the film sample had included a higher proportion of intense combat, the firing time distribution would likely have been even shorter than that shown.

Another aspect of firing speed is the number of rounds that are fired in each burst of automatic fire. Since the introduction of the M16 rifle, it has been alleged that its automatic fire capability produced excessively long bursts of fire in Vietnam and thus a great waste of ammunition (because during long bursts the muzzle may climb so high that most rounds pass high over the target).

Of the 319 M16 firings contained in the film data sample, 22 percent were automatic fire. The incidence of automatic fire was higher among Army soldiers (32 percent) than among Marines (11 percent). The number of rounds fired in each burst were counted and averaged for each firing sequence. (The sizes of the bursts used by a single man in a single firing sequence were checked and found not to vary much.) The frequency of occurrence of bursts of various sizes is shown in Figure E-4.

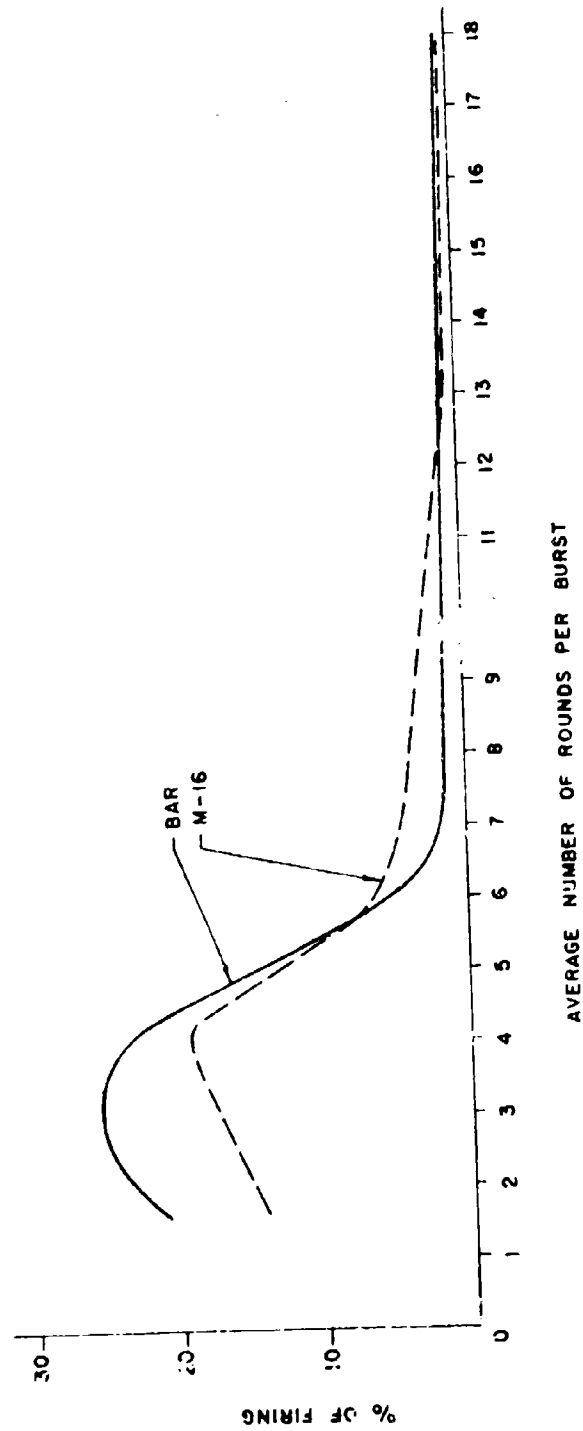


Figure E-4. Frequency distribution of sizes of M16 and BAR bursts of automatic fire.

The data show that firers used bursts longer than five rounds in only a small percentage of the 69 M16 automatic firings seen on film; about 60 percent of the firings are between two and four rounds. This is true even though many of these firers had not received any formal training in automatic fire techniques and there was no standard Army or Marine technique for such fire. The sizes of bursts shown in the figure cannot be considered optimum just because they were used in combat; as is discussed in Chapter IV, the CDEC-SAWS experiment discovered that two-round bursts are more effective than longer ones, when target effects and sustainability are weighed. Figure E-4 also shows the burst sizes used by BAR firers in World War II and Korea. These firers had been trained in 2- to 3-round burst and single-shot techniques, and it is apparent that they used slightly shorter bursts than the M16 firers; the BAR firers also had a much slower rate of fire.

#### OBSERVATIONS ON TARGET RANGE

The distribution of ranges from small arms firers to targets is generally known from various data sources, as described in Appendix D. In collecting information from combat film firing sequences, estimates were made of approximate ranges, and these are useful for comparison with range data from other sources to indicate how well the ranges in the filmed firing sequences agree with the known combat range distributions.

In 777 of the 1429 sequences, some estimate of range to target could be made. In many of these the estimate had to be rough, but in others it could be more precise.\* An estimating procedure was devised that allowed the data collectors to produce consistent estimates of ranges, based on the variety of views of target areas that were found in the filmed sample. This procedure presented the collectors with a choice of range intervals of varying sizes (e.g., 100-300 meters and 75-450 meters) so that they could appropriately express the degree of uncertainty with which they could make any

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\* Information on camera focal length was not available, so the method of calculating distances to visible objects of known size from their dimensions in the picture could not be used.

particular estimate. The raw range data are shown in Figure E-5; each bar is the width of one of the range intervals that were available for choice. The bar's height indicates the percent of times that the collectors chose that bracket. A more useful form of presentation is in Figure E-6; the overlaps of bars have been accounted for by assuming that the actual ranges to all the targets within each estimated interval were distributed uniformly and then totaling the inferred frequencies in the overlapping areas. (The distribution of actual ranges within an interval is probably not uniform, and there are likely to be fewer actual ranges falling near the extremes of the intervals than near their centers.) The smoothed curve (shown as a solid line in Figure E-6) presents a usable approximation of the range frequency for the sample of filmed firing sequences. This curve agrees quite well with the target range frequencies from very different sources shown in Appendix D. To the extent that the film sample does not include a representative sample of assaults, the target range frequencies here represent a high estimate of ranges used in small arms combat.

Since the 777 cases in which range estimates could be made constitute little more than half the total set of filmed small arms firing sequences, it is of interest to see whether this subset represents an unbiased sample of the full set. Examination revealed that weapon types were represented in about the same proportions in the subset as in the complete set, that combat theaters were represented in the proper proportions, and that the incidence of clearly pointed versus aimed or pointed weapon sighting was similar to the full set. On the other hand, Marine firings were under-represented in the subset, apparently because Army photographers were more likely than Marine photographers to include views in the direction the firer was aiming.

The difference between target range frequencies for clearly pointed fire and aimed or pointed fire is of interest. Both distributions are shown in Figure E-7 as smoothed curves derived in the same way as the distribution in Figure E-6. The distributions differ only slightly, with clearly pointed firing ranges averaging only about 10 meters shorter than the aimed or pointed ranges.

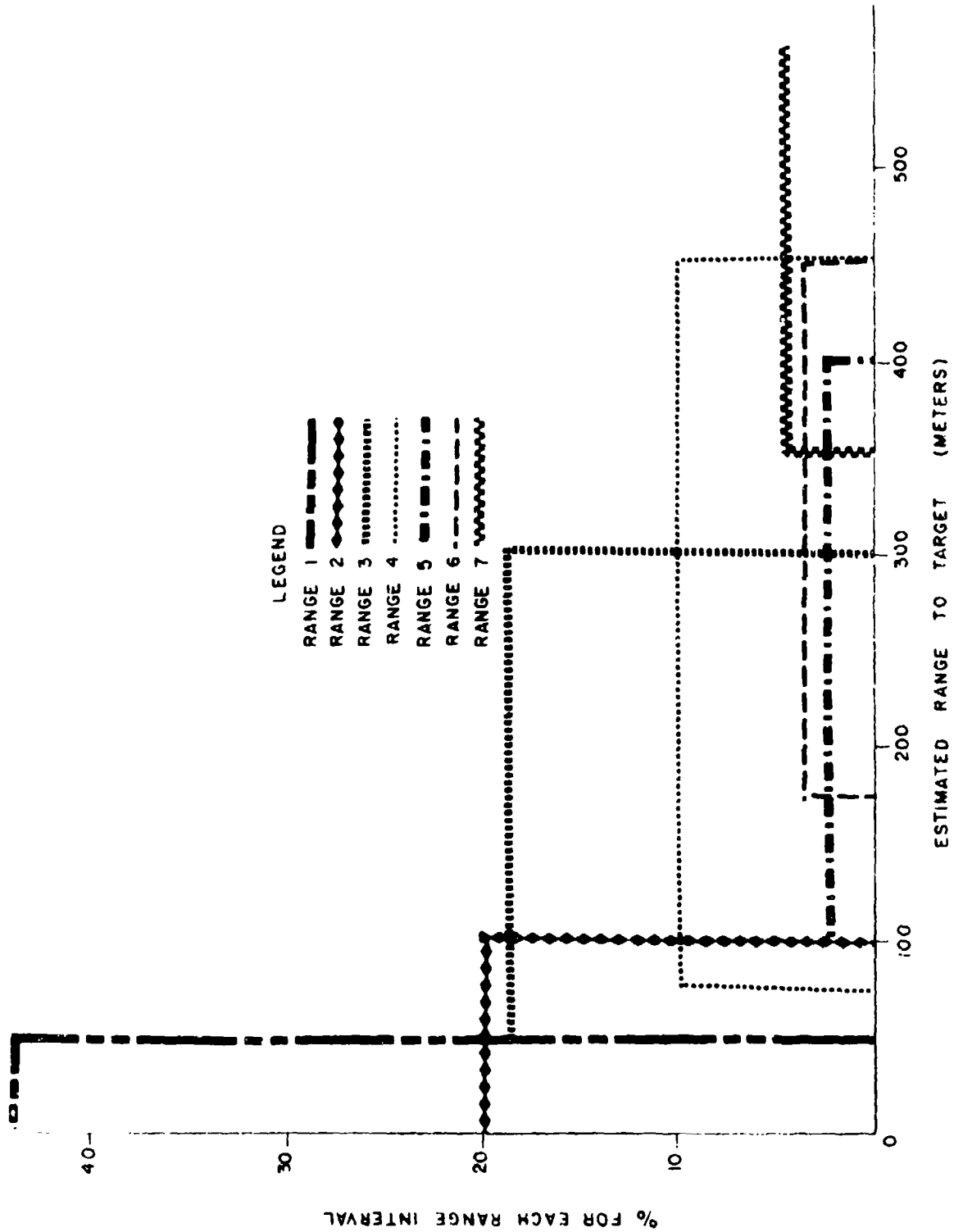


Figure E-5. Percent of times each range bracket was chosen.

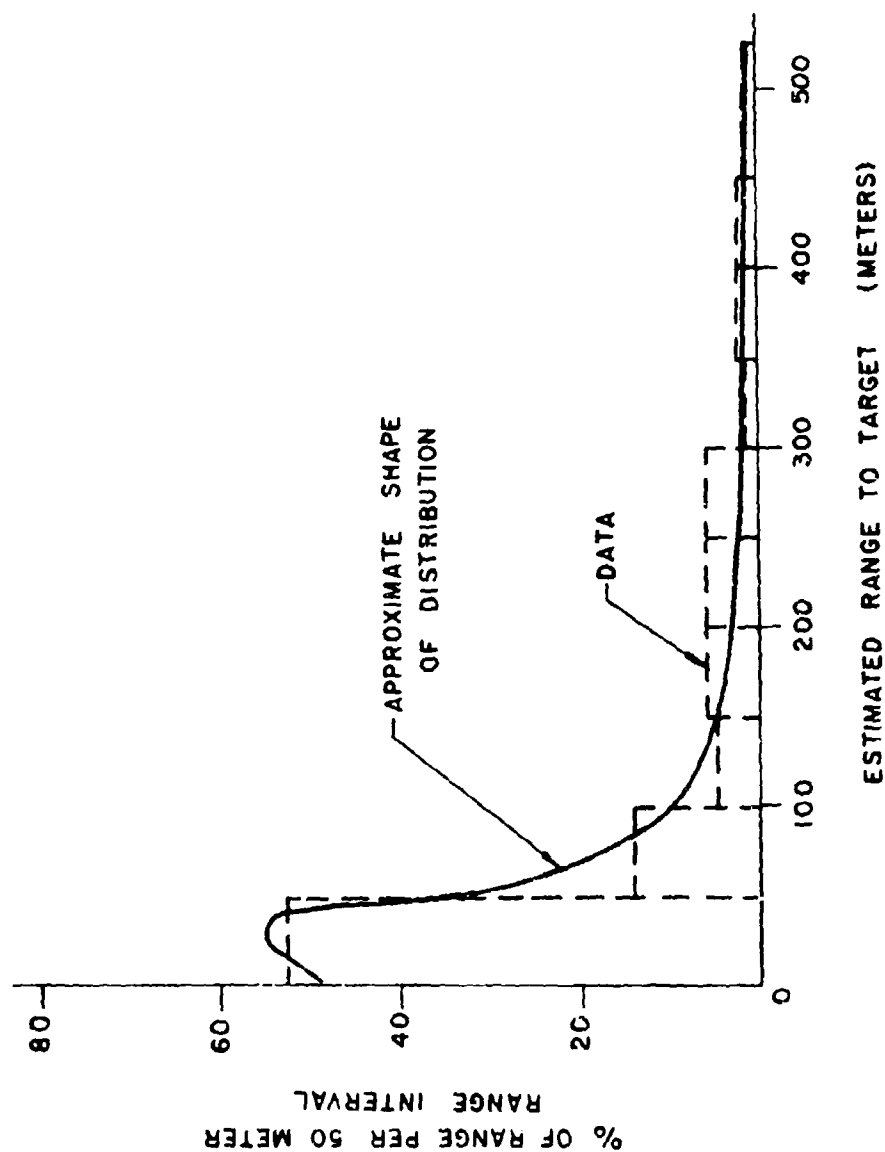


Figure E-6. Percent of estimated target range per 50-meter intervals.

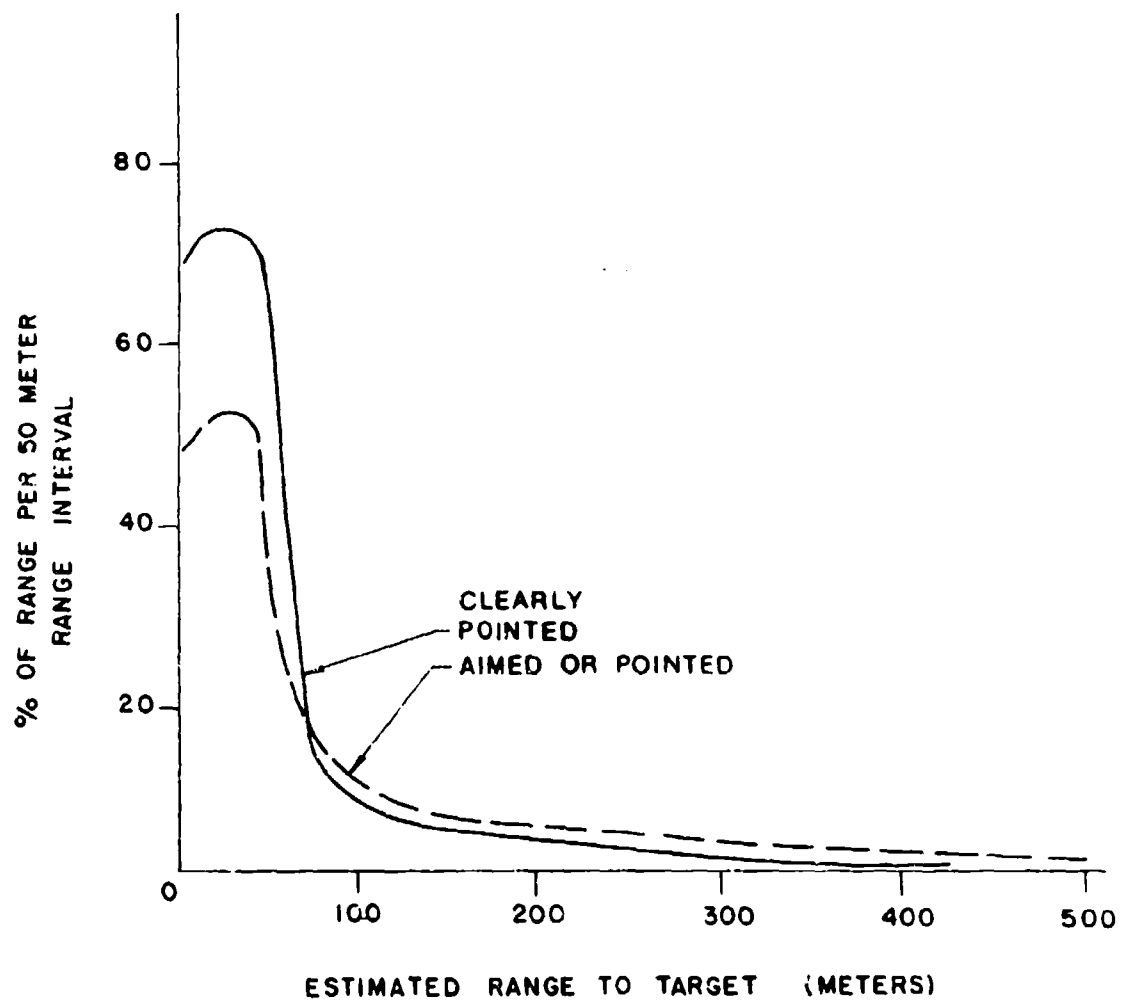


Figure E-7. Percent estimated target range per 50-meter intervals aimed and pointed fire.

COMPARISON OF FIRING POSITIONS TAUGHT IN TRAINING  
WITH THOSE TAKEN IN COMBAT

The films were also used to investigate the possibility that combat firers use firing positions that deviate significantly from the standard positions taught in U.S. infantry training. This was done by compiling the film sequences for each class of firing position (prone, standing, etc.), selecting representative samples, obtaining artists' drawings of the samples, and comparing these with the drawings of the standard firing positions contained in official training manuals. The BAR and M60 machine gun were excluded to simplify the comparison.

Selection of Firing Sequence Samples

The first step was to eliminate from further consideration the firing sequences that were not representative enough for the intended comparison. The criteria for elimination were as follows:

- o The firer's position had to be clearly visible (preferably from his right side).
- o The majority of the firer's body had to be within the camera's field of view.
- o The weapon being fired could not be supported (e.g., rested on a wall, etc.). It was believed that there were too few pictures of any one type of supported position to indicate a trend.
- o Films of firers located on steep slopes or pointing their weapons up or down at sharp angles would not be used.

When these criteria were applied, the sample of 1072 rifle and carbine firing sequences was reduced to a maximum of about 250 firings. From this group, 115 sequences were selected and prints were obtained. They were used for the following comparisons:

- o Comparison of filmed standing, kneeling, and prone positions (using the M1, M14, and M16 rifles and the carbine) with doctrinal positions.

- o Comparison of standing and kneeling positions when the firer was wearing an armored vest (M14 and M16 rifles) with positions of firers not wearing vests.
- o Comparison of firing positions when the butt of the weapon stock was not placed at the firer's shoulder (including both automatic and semiautomatic fire modes) with firing when the butt was at the shoulder.
- o Comparison of positions in which the firer clearly pointed his weapon with positions in which he appeared to aim (including both semiautomatic and automatic M16 fire).

After review of these films about half were selected as being particularly useful for more detailed examination and comparison. The specific frame of each film showing the firer just before his weapon fired was then enlarged; a tracing of the firer's main outlines was made; and the details of his body position were drawn in by a medical illustrator. These drawings were used for final comparisons and analyses of position variations.

#### Results of Drawing Comparisons

The standing, kneeling, and prone positions that were used by combat firers fell well within the allowed variation of standard positions prescribed in the applicable Army field manuals.\* None of the positions seen were awkward ones; on the contrary, most would have passed the rather exacting criteria of marksmanship trainers. Figure E-8 shows film-based drawings of standing positions with M1 and M16 rifles that are typical of the "preferred" high elbow position, and one of an M14 rifle typical of the "alternate" low elbow position. Figure E-9 shows drawings of typical kneeling positions with M1 and M16 rifles, and one of the prone position with an M16.

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\*U.S. Army and U.S. Air Force, Carbine Caliber .30 M1, M1A1, M2, and M3, Field Manual 23-7 (Washington, January 1952); U.S. Army, M14 and M14A1 Rifles and Rifle Marksmanship, Field Manual 23-8 (Washington, April 1974); U.S. Army, M16A1 Rifle and Rifle Marksmanship, Field Manual 23-9 (Washington, June 1974); U.S. Army, Rifle Marksmanship, Field Manual 23-71 (Washington, December 1966).

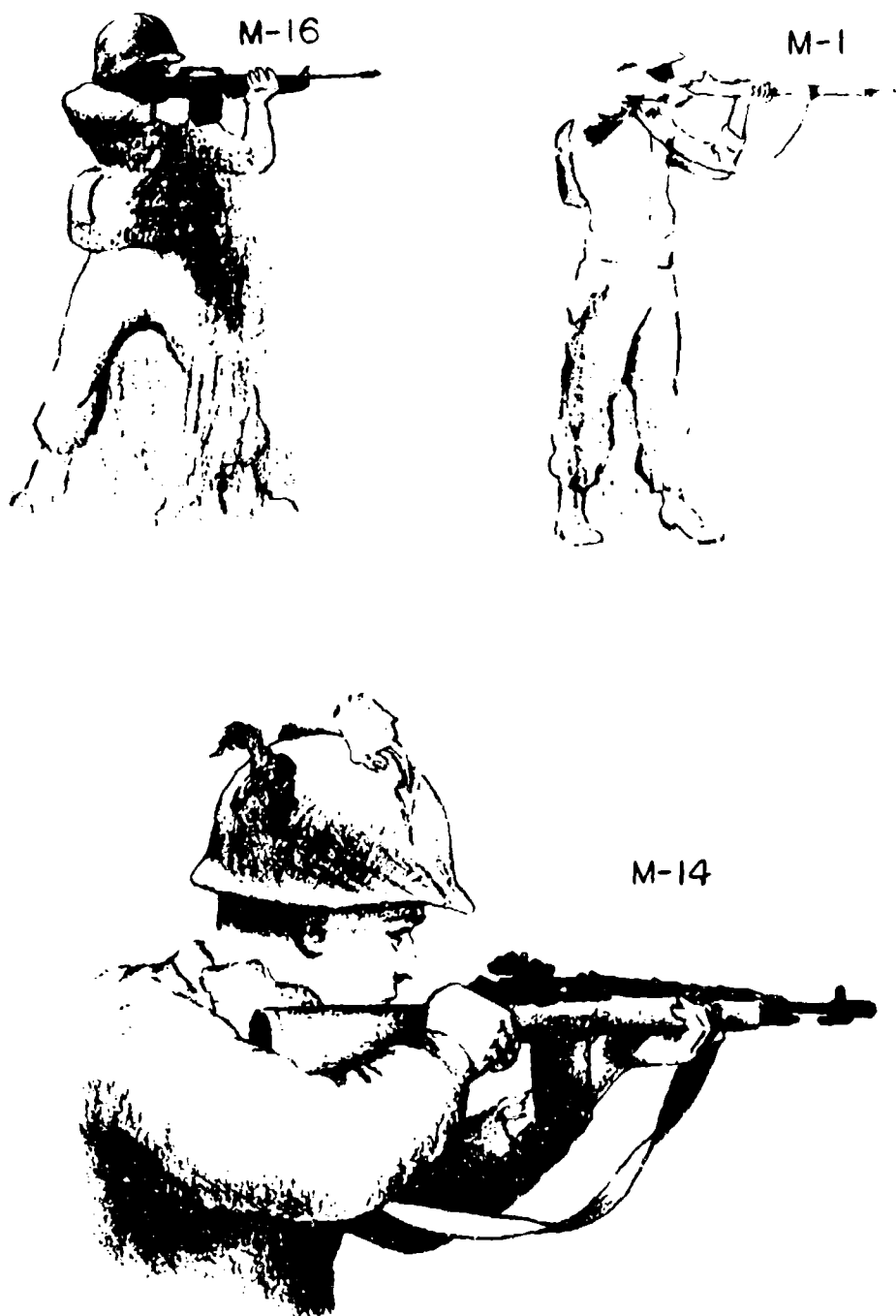
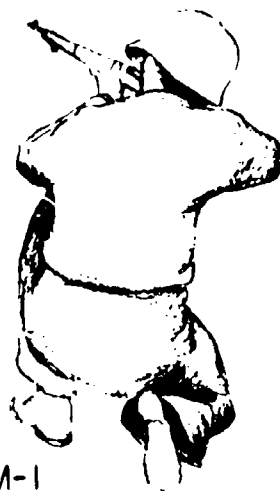


Figure E-8. Standing positions showing typical high elbow position (M1 and M16) and low elbow position (M14).



M-1



M-1



M-16



M-16

Figure E-9. Typical kneeling positions (M1 and M16) and typical prone position (M16).

When firings by men wearing armored vests were compared with similar non-vest firings using the same weapons and body positions, no difference was detectable. As far as could be seen, the vests did not affect the way the butt of the stock was placed against the firer's shoulder, change the position of his torso, or alter his normal elbow position. In all such pictures the right elbow was little if any lower than the shoulder (no prone positions were seen). Examination of the drawings of men firing weapons from the shoulder position revealed little variation. The rifle was mostly held above the waist but well below the armpit, with the right forearm approximately level and the wrist nearly straight, as shown in Figure E-10.

When the drawings of firers "pointing" their weapons (from shoulder positions) were compared with those in which they appeared to be looking through the sights, no difference in body position was seen, though of course the head position was different because "pointing" firings were detected by the head-up attitude of the firer (which causes him to look over the sights). Several M16 firers held the rifle butt a little lower on the shoulder during "pointing" firing. As shown in the example in Figure E-11, this increased the already substantial height above the sights of the firer's line of vision.

E-27

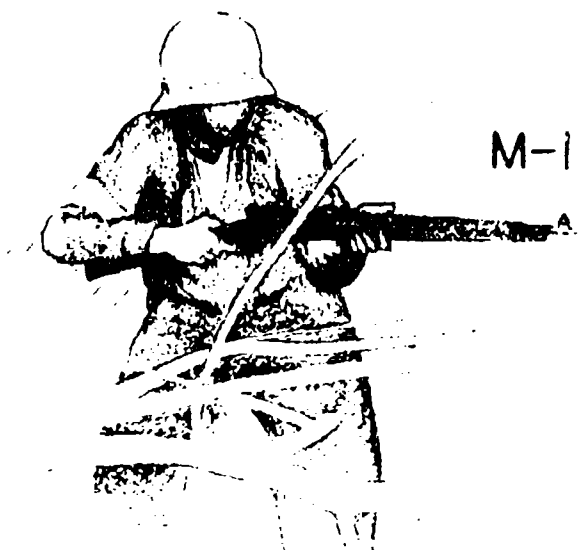
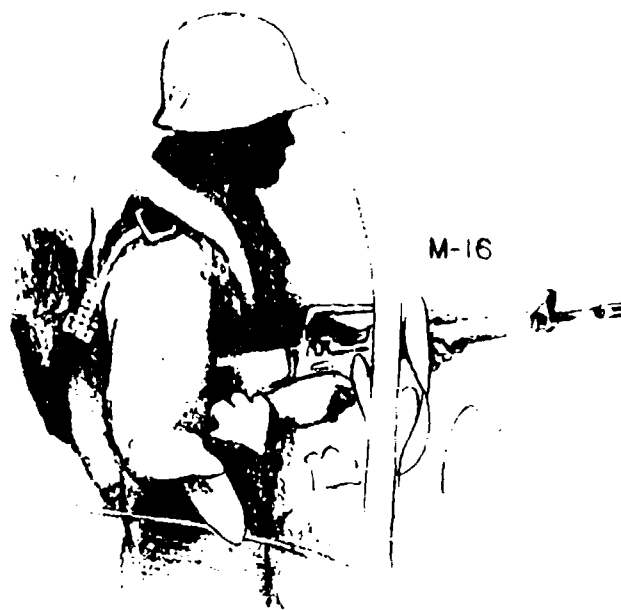


Figure E-10. Men firing weapons from other than shoulder position.



Figure E-11. Man firing M16 from other than shoulder position.

Annex to Appendix E

COMBAT FILM DATA OF SMALL ARMS FIRINGS

INTRODUCTION

This annex describes the procedures used to collect information about small arms firings from the combat films and fully lists the data that were collected.

The sources of film were the U.S. Army Motion Picture Depository and Records Center, Tobyhanna Depot, Tobyhanna, Pennsylvania, and the U.S. Marine Corps Motion Picture Archives, Quantico, Virginia. Both film repositories had similar facilities, and the collection techniques used were identical.

The specific objective was to record data that described the firer's actions (from the time he was first observed until he stopped firing or paused to reload), including his position, type of weapon, method and speed of aiming and firing, and available information about the target and the range to the target.

A tentative data collection format was developed, tested, and used to collect the following categories of information:

- o Where and when the firing sequence took place (i.e., World War II in Europe, or in the South Pacific, the Korean War, or Vietnam).
- o Activities of the firer, such as his firing position, weapon, method of aiming, and rate of fire.
- o An estimate of the range to the target area and target movement and size.
- o Assessment of the utility of the sequence for comparing firing positions with each other and with doctrinal positions (judging from film quality, camera angle, and the amount of the firer's body that could be seen).
- o Information identifying the firer's unit.

### THE COLLECTION PROCESS

The research team conducted a search of all films at both film centers by examining the identification cards that briefly describe each film (e.g., "Marine infantry and tank attack in Korea," "M-1's and tank firing"). These cards are categorized by subject (e.g., M-1, tank) and are extensively cross-referenced. Initially, 84,000 film identification cards were examined to identify the film reels which contained small arms firing sequences. Over 800 reels of film, constituting 615,000 feet of combat footage, appeared to contain such firings. All 615,000 feet of film were examined, and a total of 1429 weapon firing sequences was collected.

Selection of firing sequences was made only from footage of actual combat; training films, staged shots, and reenactments were excluded.

Items of information collected during the combat film examination were recorded on data collection sheets, checked for completeness and validity, and then entered into a computer so that they could be sorted and listed in ways convenient for analysis.

### DATA DESCRIPTORS

Below are described each of the data elements that were collected from the films. They are described in the order in which they appear in the computer printouts of the complete data (Figure 1, beginning p. E-57). The left-hand column presents the headings as they appear across the top of Figure 1 from left to right. The right-hand column describes these headings and explains the data codes.

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FIGURE 1 HEADING  
ABBREVIATIONS

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DATA ELEMENT DESCRIPTION

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LSN

This heading contains four columns which represent the "Line Sequence Number." Those lines in the data listing that are blank represent data items which were deleted because they were not usable. Thus there are 1464 line numbers but only 1429 data items.

O

Column "O" describes the "Type of Operation" (Attack, Defense, Undetermined) during the firing sequence. The code numbers below describe the items they represent:

Type of Operation

- 1 - Attack
- 2 - Defense
- 3 - Undetermined

When code number 1 - "Attack" appears in column "O" the term attack means that the firer seemed to be moving forward before and after the firing sequence or that the enemy was seen in prepared positions (foxholes, bunkers, etc.). Code number 2 - "Defense" appears when the firer was seen in a prepared position such as a foxhole or when enemy forces were seen advancing toward the firer.

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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POS

This heading contains three columns that

FSP

describe the firing position, what (if any) type of support was used for the firer's weapon, and the last stationary position the firer was in before assuming the firing position.

The left hand ("F") column contains code numbers which represent seven different firing positions. The center ("S") column contains code numbers which represent five different types of support. The right hand ("P") column contains code numbers which represent seven different "pre-fire" positions. The code numbers below describe the items they represent:

| <u>Firing<br/>Position</u> | <u>Weapon<br/>Support</u> | <u>Prefire<br/>Position</u> |
|----------------------------|---------------------------|-----------------------------|
| 1-Standing                 | 1-Elbow                   | 1-Standing                  |
| 2-Kneeling                 | 2-Magazine                | 2-Kneeling                  |
| 3-Prone                    | 3-Forward of<br>Magazine  | 3-Prone                     |
| 4-Sitting                  | 4-Bipod                   | 4-Sitting                   |
| 5-Squatting                | 5-None                    | 5-Squatting                 |
| 6-Crouch                   |                           | 6-Crouch                    |
| 7-Not to Shoulder          |                           | 7-Other                     |

---

**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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(cont.)                      In the firing position column code number 7-

POS                      "Not to Shoulder" indicates only that the rifle

FSr                      was not at the firer's shoulder (e.g., weapon  
held underarm or at waist or at hip).

Code number 1 - "Elbow" in the center  
column was not entered when the use of the elbow  
as a support was a normal aspect of that  
position (e.g., left elbow placed on knee in  
the kneeling position or both elbows on the  
ground in the prone position).

The right hand column describes the firer's  
last stationary position before he assumed his  
firing position.

AIM                      This heading contains three columns that  
describe the method of sighting the firer  
M                      apparently used, any movement or lack of move-  
ment of the firer during the firing sequence,  
and the consistency of such movement.

The left hand (M) column contains code  
numbers which represent six different methods  
of sighting. The center column (I) contains  
code numbers which represent five different

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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(cont.)

AIM types of movement. The right hand column (M)  
M contains code numbers which represent three  
different types of consistency. The code  
numbers below describe the items they represent:

| <u>Sighting<br/>Method</u> | <u>Movement Between<br/>Trigger Pulls</u> | <u>Consistency<br/>of Movement</u> |
|----------------------------|-------------------------------------------|------------------------------------|
| 1-Aim                      | 0-Not Applicable                          | 0-No Change                        |
| 2-Point*                   | 1-No Change                               | 1-Most of<br>time/<br>always       |
| 3-Aim/Track                | 2-Raised Head                             | 2-Some of<br>the time              |
| 4-Aim/Traverse             | 3-Lowered Rifle                           |                                    |
| 5-Point/Track*             | 4-Other                                   |                                    |
| 6-Point/Traverse*          |                                           |                                    |

In the sighting method column the term  
"aim" means the firer appeared to be able to  
see through the sights of his weapon. The

---

\*When code number 7 - "Not to Shoulder" appears in the firing  
position (F) column, one of three code numbers (2, 5, 6) appears in  
the sighting method column, because it would be impossible for the  
firer to use a clearly aimed method of fire from the "Not to Shoulder"  
position.

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FIGURE 1 HEADING  
ABBREVIATIONS

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DATA ELEMENT DESCRIPTION

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(cont.)

AIM

M

term "point" means the firer did not appear to have been able to see through the sights of his weapon. The term "track" means that the firer was moving his weapon smoothly in a horizontal direction as if tracking a moving target. The term "traverse" means the firer was moving his weapon in a horizontal direction but stopped for each trigger pull.

In the "movement between trigger pulls" column the entry 0 - "Not Applicable" means that there was only one trigger pull. 1 - "No Change" appears when there was more than one trigger pull in which no movement of head or rifle between trigger pulls was observed. When 4 - "Other" appears in the center column, this describes more than one movement, usually meaning that both 2 - "Raised Head" and 3 - "Lowered Rifle" occurred.

In the "consistency of movement" column 0 - "No Change" appears when there was only one trigger pull or when no change was entered in the previous column.

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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W

This heading contains two columns that

A

describe the type of weapon and mode of fire.

The left hand column (W) contains six code numbers which represent the different types of weapons. The right hand column (A) contains two code numbers which represent the fire mode. The code numbers below describe the items they represent:

| <u>Weapon ("W")</u>                                | <u>Fire Mode ("A")</u>     |
|----------------------------------------------------|----------------------------|
| 1 - M-1 Rifle                                      | 1 - Single Shot            |
| 2 - M-1 or M-2 Carbine                             | 2 - Burst (full automatic) |
| 3 - M-14 Rifle                                     |                            |
| 4 - M-16 Rifle                                     |                            |
| 5 - Browning Automatic Rifle                       |                            |
| 6 - M-60 Light Machine Gun<br>(Bipod Mounted Only) |                            |

In the weapon column when the code number 2 - "M-1 or M-2 Carbine" appears the weapon can be an M-2 carbine when the code number 2 - "Burst" also appears in the fire mode column.

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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RD/                      This heading contains two columns which  
BUR                      present the average number of rounds per trigger  
pull when code number 2 - "Burst" appears in  
the fire mode ("A") column (see p. E-36).  
The average number of rounds per trigger pull  
was determined by dividing the total number  
of rounds expended by the total number of  
trigger pulls. When "1" appears in the TRG  
PUL column the number appearing in the RD/BUR  
column represents the exact number of rounds  
expended for one trigger pull.

16                      This heading contains two columns which  
B                      present data about the M-16 rifle.  
T

The left hand column contains two code  
numbers which represent M-16 burst length.  
The right hand column contains three code  
numbers which represent M-16 tracer use.  
The code numbers below describe the items they  
represent:

---

**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**

| (cont.) | <u>M-16 Burst Length</u> | <u>M-16 Tracer Use</u> |
|---------|--------------------------|------------------------|
| 16      | 0 - Not Applicable       | 0 - Not Applicable     |
| B       |                          |                        |
| T       | 1 - More than 8 rounds*  | 1 - Yes                |
|         |                          | 2 - No                 |

**FIRE TIME**  
**1ST SUB ALL**

The Fire Time heading contains three columns which contain fire times in seconds and tenths of seconds. Fire time is defined as meaning the time it took to aim/point at a target and pull the trigger. This time starts with the weapon in position (e.g., rifle at shoulder) and ends with the trigger pull. Times were calculated from numbers of film frames and camera speed.

The left hand ("1st") column contains the fire time for the aim/point time for the first trigger pull. In some cases this first fire time may not be the complete time because the firer had his weapon at his shoulder when the

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\* This was only a gross indicator, but burst size was also determined more precisely as described above (see RD/BUR).

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 FIGURE 1 HEADING  
 ABBREVIATIONS
 

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 DATA ELEMENT DESCRIPTION
 

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(cont.)  
 FIRE TIME

1ST SUB ALL

sequence started. In these cases, it was impossible to tell how long he had been sighting. Those cases are identifiable under the heading TIM/TO/POS (p. E-41). If in this column the time entered is 0.0, the first fire time cannot be considered to be the full aim/point time.

The center ("SUB") column contains the average aim/point fire time for each subsequent trigger pull. (When this number is 0.0 it means there was only one trigger pull, which is also shown in the TRG/PUL column.)

The right hand ("ALL") column contains the average aim/point fire time for all trigger pulls (including the first).

R  
 C  
 H

This heading contains one column which represents the change of trigger pull rate. The term "trigger pull rate" means the speed with which the firer discharged his weapon in a series of trigger pulls. This data was collected to see if there was any noticeable change in trigger pull rate during sustained

| FIGURE 1 HEADING<br>ABBREVIATIONS | DATA ELEMENT DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (cont.)                           | <p>firing sequences. Code numbers 2 - "Fast to Slow" and 3 - "Slow to Fast" are the ones that show a (recognizable) change (however, they only appear in 4 percent of the cases). Code numbers 0 - "Not Applicable" (i.e., only one trigger pull shows on the film) and 1 - "Constant" appear the rest of the time.</p>                                                                                                                                                                                                                |
| R<br>C<br>H                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| D<br>I<br>R                       | <p>This heading contains one column which represents the direction of fire. The term "Direction of Fire" refers to pointing the weapon up or down. The code numbers are listed below:</p> <p><u>Direction of Fire</u></p> <p>0 - Not Applicable</p> <p>1 - Up</p> <p>2 - Down</p> <p>When code numbers 1 - "Up" or 2 - "Down" appear in the direction of fire column this means that the weapon's vertical angle was great enough to distort the normal body firing position (e.g., man in street firing into upper story window).</p> |

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FIGURE 1 HEADING  
ABBREVIATIONS

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DATA ELEMENT DESCRIPTION

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TIM  
TO  
POS

This heading contains two columns which contain the "Time to Position" in seconds and tenths of seconds. This data was collected in an effort to see how long it took a firer to go from a prefire position to a firing position (e.g., standing to prone). By referring to the POS/FSP headings and comparing the left hand (F) column code number to the right hand (P) column code number, it is possible to single out those few occurrences where there was a difference between the prefire and fire positions. When the left hand (F) column and the right hand (P) column have the same code numbers, there was no change in position just before firing, and the time that appears in the "time to position" column describes the time it took the firer to get the weapon to his shoulder.

The times that appear in the "Time to Position" column are somewhat misleading because some of them also include time in which no movement occurred (e.g., a firer was seen standing, stood for some seconds, and then went into a

| FIGURE 1 HEADING<br>ABBREVIATIONS | DATA ELEMENT DESCRIPTION                                                                                                                                                                                                                                                                                                  |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (cont.)                           | prone fire position). Only the minimum                                                                                                                                                                                                                                                                                    |
| TIM<br>TO<br>POS                  | times entered in this column are useful indicators of time required. When 0.0 appears in the "time to position" column this means that the firer had his weapon at his shoulder when the firing sequence was first seen on the film.                                                                                      |
| TRG<br>PUL                        | This heading contains two columns which represent the total number of trigger pulls. These numbers describe the total number of times the firer pulled the trigger (e.g., a firer firing two rounds semi-automatic would appear as 02; a firer firing three bursts of automatic fire would appear as 03).                 |
| 2ND POSN<br>FS M A D              | This heading contains five columns which describe changes in firing positions, aim methods, use of automatic fire, and pointing up or down during a single firing sequence. These data were collected to see if there was any detectable change made by the firer after the first trigger pull in a firing sequence (in a |

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 FIGURE 1 HEADING  
ABBREVIATIONS
 

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## DATA ELEMENT DESCRIPTION

(cont.)

2ND POSN

FS M A D

majority of the cases there was no change in any of the items noted). When a change took place after the first trigger pull, the data do not describe at what point during the sequence it took place.

The left hand (F) column represents the second firing position (parent column - "F" - Firing Position). The "S" column represents the second type of support (parent column - "S" type support). The "M" column represents the second sighting method (parent column - "M" sighting method). The "A" column represents the second firing mode (parent column - "A" firing mode). The right hand (D) column represents the second direction of fire (parent column - "DIR" direction of fire).

 R  
G  
E

This heading contains one column of code numbers which describe the firing range. The term "firing range" is defined as meaning estimated distance from the firer to the target area. Because range was difficult to estimate from the film, a process which produced

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 FIGURE 1 HEADING  
 ABBREVIATIONS
 

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 DATA ELEMENT DESCRIPTION
 

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(cont.)

 R  
 G  
 E

consistent estimates from three observers was developed on the basis of brackets of range within which the estimate could be confidently estimated to fall (e.g., code number 3 means the target was not further away than 300 meters and was not closer than 50 meters to the firer). The code numbers below describe the range brackets they correspond to:

Firing Range

- 0 - Undetermined
- 1 - Not more than about 50 meters
- 2 - Not more than about 100 meters
- 3 - Not less than about 50 meters and not more than about 300 meters
- 4 - Not less than about 75 meters and not more than about 450 meters
- 5 - Not less than about 100 meters and not more than about 400 meters
- 6 - Not less than about 175 meters and not more than about 450 meters
- 7 - Not less than about 350 meters

---

**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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M  
E  
C

This heading contains three columns which describe how firers moved to the location of their firing positions (when such movement was seen), the amount each was exposed to view from the direction of the target area, and whether the part of each that was not exposed was behind physical cover or only concealed.

The left hand ("M") column describes any movement of the firer to his fire location.

The center ("E") column describes the amount of each firer that was visible from the area toward which he was firing.

The right hand ("C") column describes the firer's use of cover and concealment.

The code numbers below describe the items they represent:

| <u>Moving into<br/>Fire Location</u> | <u>Firer's Exposure</u> | <u>Use of<br/>Cover and<br/>Concealment</u> |
|--------------------------------------|-------------------------|---------------------------------------------|
| 0 - No movement                      | 1 - Full                | 0 - None                                    |
| 1 - Walk                             | 2 - Half                | 1 - Cover                                   |
| 2 - Run                              | 3 - Minimum             | 2 - Concealment                             |
| 3 - Crawl                            |                         | 3 - Cover/<br>Concealment                   |

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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(cont.)

M  
E  
C

When the code number 0 - "no movement observed" appears in the left hand ("M") column this means the firer was, when first seen on the film, already at his fire location. The code number 4 - "Other" appears when more than one way was used to move into fire location (e.g., firer walked and then ran to his fire location).

When code number 1 - "Full"\* appears in the center ("E") column this means the firer was as completely visible to his target area as his firing position would permit (e.g., firer in prone position with no cover or concealment). The code number 2 - "Half" appears when the firer had roughly half of his body (as it appeared in that position) exposed in the direction of his target area (e.g., firer standing in waist high grass).

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\* When this code number appears the code number 0 - "None" will always appear in the right hand "C" column.

| FIGURE 1 HEADING<br>ABBREVIATIONS | DATA ELEMENT DESCRIPTION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-----------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (cont.)                           | When the code number 3 - "Minimum" appears in the center ("E") column the firer had a very small portion of his body exposed in the direction of his target area (e.g., firer kneeling behind a fallen tree).                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| M<br>E<br>C                       | <p>When code number 0 - "None" appears in the right hand ("C") column this means the firer was fully exposed. When code number 1 - "Cover" appears this means the firer was partly behind some type of material that would presumably stop a bullet, e.g., standing behind a wall. (The amount of the firer that was behind the cover is indicated in the center column.) The code number 2 - "Concealment" appears when the firer was behind some type of material that would not stop a bullet, such as a bush. When code number 3 - "Cover/Concealment" appears this means that the firer was behind a mix of the two types of materials--some partly "concealed" (e.g., kneeling behind a fallen tree with branches concealing a further part of his body).</p> |

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**FIGURE 1 HEADING  
ABBREVIATIONS**


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**DATA ELEMENT DESCRIPTION**


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OTHR  
C U  
F

This heading contains four columns which describe the action of other soldiers who were visible in the film of soldier firing a small arm.

The left hand ("O") column describes whether or not there were others in the firing sequence. Column "C" describes the appearance of other soldiers in the sequences in terms of whether or not they appeared to be concerned about what the firer was doing. Column "F" indicates whether anyone else in the group of men who were visible was firing a weapon. Column "U" indicates whether most of these other men had taken cover or not.

The code numbers below describe the items they represent:

Others in Sequence

0 - Not applicable  
1 - Other in sequence

Concerned

0 - Not applicable  
1 - Yes  
2 - No

---

 FIGURE 1 HEADING  
 ABBREVIATIONS

 DATA ELEMENT DESCRIPTION
 

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| (cont.) | <u>Firing</u>      | <u>Undercover</u>  |
|---------|--------------------|--------------------|
| OTHR    | 0 - Not applicable | 0 - Not applicable |
| C U     | 1 - Yes            | 1 - Yes            |
| F       | 2 - No             | 2 - No             |

In the left hand ("O") column when the code number 0 - "Not applicable" appears, this describes that the firer was the only soldier seen in the film of the firing sequence. (When this code number ("O") appears, columns "C", "F", and "U" will, also, appear as zeros.) When the code number 1 - "Other in sequence" appears, this means some number of people were present in the firing sequence other than the firer. There is no way of accurately determining how many people were in a firing sequence.\*

When the code number 1 - "Yes" appears in column "C" this describes the apparent attitude of the majority of the people, other than the firer, as being interested in or concerned

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\*When code number 1 - "Others in sequence" appears in column "O", the number that appears under column "No" describes the position of the firer in the group, counting from the left--see p. E-54.

| FIGURE 1 HEADING<br>ABBREVIATIONS | DATA ELEMENT DESCRIPTION                                                                                                                                                                                                                                                                                 |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (cont.)                           | about what the firer was shooting at. When                                                                                                                                                                                                                                                               |
| OTHR                              | the code number 2 - "no" appears, this indicates                                                                                                                                                                                                                                                         |
| C U                               | that the majority of the other soldiers were                                                                                                                                                                                                                                                             |
| F                                 | taking little or no interest in what the firer<br>was shooting at.                                                                                                                                                                                                                                       |
|                                   | <p>When code number 1 - "Yes" appears in<br/>column "F" this describes that one or more of<br/>the other soldiers in the firing sequence was<br/>also firing.</p>                                                                                                                                        |
|                                   | <p>When code number 1 "Yes" appears in<br/>column "U" this meant that soldiers other<br/>than the firer were seen taking cover.</p>                                                                                                                                                                      |
| MSUM<br>OIRA<br>VZBN              | <p>This heading contains four columns which<br/>describe the target's movement or lack of move-<br/>ment, the size of the target, whether or not<br/>the firer's location was in an urban area, and if<br/>the firer was firing from a man-made position<br/>or not (e.g., foxhole, building, etc.).</p> |
|                                   | <p>The left hand ("V") column describes<br/>whether the target appeared to be moving.<br/>Column "Z" describes the estimated size of the</p>                                                                                                                                                             |

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 FIGURE 1 HEADING  
 ABBREVIATIONS

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 DATA ELEMENT DESCRIPTION
 

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(cont.)

 MSUM  
 OIRA  
 VZBN

target area being fired at. Column "B" describes whether or not the firing sequence took place in a city or large village. Column "N" describes whether or not the firer's position was man-made (such as a foxhole, bunker, etc.). The code numbers below describe the items they represent:

Target Movement

- 0 - Undetermined\*
- 1 - Stationary
- 2 - Moving

Target Size

- 0 - Undetermined\*
- 1 - Point
- 2 - Small Area
- 3 - Large Area

Urban Area

- 1 - Yes
- 2 - No

Position Man-Made

- 1 - Yes
- 2 - No

In column "Z" when the code number 1 - "point" appears, the term point describes the target size as being about that of a field fortification embrasure or an individual. When the code number 2 - "small area" appears the

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\*I.e., target could not be seen.

---

FIGURE 1 HEADING  
ABBREVIATIONS

DATA ELEMENT DESCRIPTION

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(cont.)

MSUM  
OIRA  
VZBN

term small area describes the target size as being about that of a window/door or large weapon signature or tank/truck. When the code number 3 - "large area" appears, the term large area describes the target size as being about that of a building (shooting through walls) or a treeline or no specifically defined target.

The remaining headings contain columns which describe data items that were used for administrative use (e.g., DATE, FRAME, etc.) and in the selection of pictures of men firing for analysis of firing positions details.

Q

The "Q" column describes how clearly the firer can be seen-- "1" means "well" and "2" means "poorly."

V

Column "V" describes how much of the firer appears in the film--"1" means "full" view, "2" means "half" and "3" means that only a small "portion" of the firer's body was visible.

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FIGURE 1 HEADING  
ABBREVIATIONS

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DATA ELEMENT DESCRIPTION

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AN                      Columns "AN" describe the camera's horizontal angle relative to the direction of fire in clock terms (i.e., "One o'clock" is shown as "01").

A                      The "A" column describes whether or not the  
R                      R  
firer was wearing torso body armor. (This data was collected to see if body armor would have any effect on the placement of the weapon against the firer's shoulder.) Code number "1" appears when the firer was wearing upper body armor, and code number "2" when the firer was not.

S                      Column "S" describes a ground slope in the area the firer occupied that would affect the firer's position--"0" means there was "no effect" on the firer's position, "1" means there was an "upward effect" (i.e., firer positioned on a steep incline facing toward the top of the incline), "2" means there was a "downward effect" (i.e., firer positioned on a steep decline facing toward the bottom of the decline).

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**FIGURE 1 HEADING  
ABBREVIATIONS**
**DATA ELEMENT DESCRIPTION**


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|      |                                                                                                                                                                                                                                                                                                        |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| NO   | Column "No" describes the position of the firer when some number of people were present in the firing sequence other than the firer, counting from the left (e.g., 04 means there were 3 other people to the left of the firer). "00" appears when only the firer was present in the firing sequences. |
| REEL | This heading describes where the film was viewed and the reel number. In the left hand column "1" means the film was viewed at the Army Motion Picture Depository and Records Center (AMPD-RC) and "2" means the U.S.M.C. Motion Picture Archives. The remaining columns indicate the reel number.     |
| FE   | This heading contains columns which describe (in feet and frames) the starting point of the firing sequence.                                                                                                                                                                                           |
| DATE | This heading contains columns which describe the calendar date (day, month, year) the firing sequences took place (e.g., 050345 means 5 March 1945).                                                                                                                                                   |

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 FIGURE 1 HEADING  
ABBREVIATIONS
 

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## DATA ELEMENT DESCRIPTION

R                      Column "R" describes whether the firer was attached to a different unit from his normal organic assignment (code number "1") or attached to an organizational type other than those described in column "B" (code number "2") or not. Code number R "0" means "unknown."

BN                    This heading contains three columns which describe the firer's battalion numerical designation (right justified, e.g., 78th battalion appears as 078).

B                      Column "B" describes the firer's "Battalion  
R                      Branch Type." The code numbers below the items they represent:

Battalion Branch Type

|                    |                    |
|--------------------|--------------------|
| 0 - Unknown        | 6 - Engineer       |
| 1 - Tank Destroyer | 7 - Ranger/Special |
| 2 - Artillery      | Forces             |
| 3 - Tank/Armored   | 8 - Marine         |
| 4 - Recon          | 9 - Other          |
| 5 - Infantry       |                    |

REG                    This heading contains three columns which describe the firer's Regimental numerical designation (right justified, e.g., 78th Regiment appears as 078).

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**FIGURE 1 HEADING  
ABBREVIATIONS**
**DATA ELEMENT DESCRIPTION**


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|             |                                                                                                                                                                                                                |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DIV         | This heading contains three columns which describe the firer's Division numerical designation (right justified, e.g., 99th Division appears as 099).                                                           |
| B           | Column "B" describes the firer's "Division Branch Type" and has the same code numbers as the "B" column.<br>R                                                                                                  |
| A<br>M      | Column "A" describes which "Military Force" the firer was in--"1" means "U.S. Army" and "2" means "U.S. Marine Corps."<br>M                                                                                    |
| L<br>O<br>C | Column "L" describes in which conflict the firing sequence took place--"1" means "World War II in Europe," "2" means "World War II in the South Pacific," "3" means "Korea" and "4" means "Vietnam."<br>O<br>C |

FIGURE 1

## SMALL ARMS EFFECTIVENESS DATA

| FIRE TIME |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | R D I T M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | THG 2ND POSN |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | R M   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | J O T H R |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | M S U M |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | Q A N O |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | R E E L |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | F R A M E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D A T E |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | B N R |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | R R E G |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | D I V |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  | L       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |   |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |       |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  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|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE | TIME  | R   | D   | TIM | TRG | 2ND | POSH | R  | M  | OTM | MSUM | O | A   | NO   | REEL | FRAME    | DATE       | BM     | B           | R       | REG     | B  | MC |
|------|-----|-----|-------|------|-------|-----|-----|-----|-----|-----|------|----|----|-----|------|---|-----|------|------|----------|------------|--------|-------------|---------|---------|----|----|
| 0    |     |     |       |      |       |     |     |     |     |     |      |    |    |     |      |   |     |      |      |          |            |        |             |         |         |    |    |
| FSP  | M   | A   | T     | 1ST  | SUB   | ALL | H   | M   | POS | PUL | FS   | M  | A  | D   | E    | C | F   | VZBN | AN   | S        |            |        |             |         |         |    |    |
| 0050 | 1   | 151 | 111   | 21   | 0.000 | 0.3 | 1.2 | 0.8 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 2 | 010 | 0000 | 1212 | 12072000 | 1000001955 | 079502 | 05034500000 | 0000033 | 11      |    |    |
| 0051 |     |     |       |      |       |     |     |     |     |     |      |    |    |     |      |   |     |      |      |          |            |        |             |         |         |    |    |
| 0052 | 1   | 252 | 100   | 11   | 0.000 | 1.7 | 0.0 | 1.7 | 0   | 0   | 5.2  | 01 | 00 | 0   | 0    | 1 | 021 | 1121 | 0021 | 23092002 | 1000001715 | 069707 | 10034400000 | 0000000 | 0000000 | 22 |    |
| 0053 | 1   | 151 | 100   | 11   | 0.000 | 1.4 | 0.0 | 1.4 | 0   | 0   | 5.4  | 01 | 00 | 0   | 0    | 1 | 110 | 0000 | 1122 | 21062000 | 1000001631 | 006112 | 22064400000 | 1863415 | 12      |    |    |
| 0054 | 3   | 131 | 100   | 11   | 0.000 | 1.7 | 0.0 | 1.7 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 1121 | 0021 | 21072001 | 1000001334 | 006507 | 11074400025 | 0380025 | 11      |    |    |
| 0055 | 3   | 131 | 100   | 52   | 2.000 | 2.8 | 0.0 | 2.9 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 1121 | 0021 | 12042002 | 1000001334 | 005404 | 11074400025 | 0380025 | 11      |    |    |
| 0056 |     |     |       |      |       |     |     |     |     |     |      |    |    |     |      |   |     |      |      |          |            |        |             |         |         |    |    |
| 0057 | 3   | 252 | 100   | 21   | 0.000 | 2.1 | 0.0 | 2.1 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 021 | 0000 | 0011 | 11032000 | 1000003751 | 000312 | 21034500000 | 0000055 | 11      |    |    |
| 0058 | 1   | 353 | 100   | 11   | 0.000 | 2.0 | 0.0 | 2.0 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 1 | 031 | 0000 | 1222 | 12042000 | 1000002627 | 037901 | 02114400000 | 1100285 | 11      |    |    |
| 0059 | 1   | 434 | 111   | 11   | 0.000 | 1.0 | 2.5 | 2.0 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 2 | 031 | 1111 | 0011 | 21042002 | 1000002719 | 062007 | 17114400000 | 0471045 | 11      |    |    |
| 0060 | 1   | 434 | 111   | 11   | 0.000 | 1.2 | 4.8 | 3.0 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 2 | 031 | 1111 | 0011 | 12042001 | 1000002719 | 062007 | 17114400000 | 0471045 | 11      |    |    |
| 0061 | 1   | 434 | 111   | 11   | 0.000 | 1.0 | 1.0 | 1.0 | 1   | 0   | 1.3  | 02 | 00 | 0   | 0    | 2 | 031 | 1111 | 0011 | 11052002 | 1000002719 | 063801 | 17114400000 | 0471045 | 11      |    |    |
| 0062 | 1   | 434 | 100   | 11   | 0.000 | 1.0 | 0.0 | 1.0 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 2 | 031 | 1111 | 0011 | 11042001 | 1000002719 | 063801 | 17114400000 | 0471045 | 11      |    |    |
| 0063 | 1   | 732 | 231   | 11   | 0.000 | 3.0 | 6.2 | 5.1 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 1 | 031 | 0000 | 1122 | 12062100 | 1000003107 | 060409 | 20104400000 | 0003000 | 12      |    |    |
| 0064 | 3   | 131 | 100   | 11   | 0.000 | 2.3 | 0.0 | 2.3 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 3 | 010 | 1121 | 0021 | 11022009 | 1000003203 | 013405 | 30104400000 | 0003000 | 12      |    |    |
| 0065 | 3   | 343 | 111   | 52   | 4.000 | 2.5 | 2.9 | 2.7 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 7 | 010 | 0000 | 1222 | 21062000 | 1000003265 | 050607 | 04024500035 | 0390095 | 11      |    |    |
| 0066 | 3   | 343 | 100   | 52   | 5.000 | 2.2 | 0.0 | 3.1 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 7 | 010 | 0000 | 1222 | 21062000 | 1000003265 | 053811 | 04024500035 | 0390095 | 11      |    |    |
| 0067 | 3   | 252 | 111   | 11   | 0.000 | 0.7 | 1.3 | 1.1 | 1   | 0   | 0.0  | 04 | 00 | 0   | 0    | 7 | 010 | 0000 | 1222 | 21062000 | 1000003265 | 053811 | 04024500035 | 0390095 | 11      |    |    |
| 0068 | 3   | 252 | 111   | 11   | 0.000 | 0.7 | 1.5 | 1.2 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 7 | 010 | 1112 | 1222 | 21042003 | 1000003265 | 055013 | 04024500035 | 0390095 | 11      |    |    |
| 0069 | 3   | 151 | 111   | 11   | 0.000 | 1.4 | 2.1 | 1.8 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 7 | 010 | 0000 | 1222 | 22062000 | 1000003265 | 057805 | 04024500035 | 0390095 | 11      |    |    |
| 0070 | 3   | 353 | 200   | 52   | 2.000 | 6.1 | 0.0 | 6.2 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 4 | 010 | 0000 | 1322 | 22052000 | 1000003265 | 063911 | 04024500035 | 0390095 | 11      |    |    |
| 0071 | 1   | 252 | 100   | 11   | 0.000 | 0.6 | 0.0 | 0.6 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 3 | 022 | 1121 | 1322 | 11072001 | 1000003747 | 014205 | 21034500000 | 3170300 | 11      |    |    |
| 0072 | 1   | 414 | 100   | 11   | 0.000 | 2.4 | 0.0 | 2.4 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 1 | 031 | 1111 | 1321 | 11042001 | 1000003747 | 027112 | 25034500035 | 3050775 | 12      |    |    |
| 0073 | 1   | 414 | 111   | 11   | 0.000 | 1.5 | 1.7 | 1.6 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 1 | 031 | 1111 | 1321 | 11042002 | 1000003747 | 027112 | 25034500035 | 3050775 | 12      |    |    |
| 0074 | 1   | 751 | 211   | 11   | 0.000 | 0.6 | 0.4 | 0.5 | 1   | 0   | 0.0  | 04 | 00 | 0   | 0    | 0 | 010 | 1122 | 0012 | 21042002 | 1000003725 | 045909 | 20034500000 | 0000043 | 11      |    |    |
| 0075 | 1   | 111 | 100   | 21   | 0.000 | 2.2 | 0.0 | 2.2 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 0000 | 1311 | 23022002 | 1000003725 | 089201 | 20034500000 | 0000043 | 11      |    |    |
| 0076 | 1   | 151 | 100   | 11   | 0.000 | 1.8 | 0.0 | 1.8 | 0   | 0   | 1.0  | 01 | 00 | 0   | 0    | 0 | 121 | 1121 | 0021 | 21062003 | 1000003725 | 089201 | 20034500000 | 0000043 | 11      |    |    |
| 0077 | 3   | 151 | 111   | 11   | 0.000 | 1.2 | 3.1 | 2.1 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 3 | 031 | 0000 | 1311 | 13052000 | 1000003660 | 039712 | 18034500000 | 0000043 | 11      |    |    |
| 0078 | 3   | 555 | 121   | 11   | 0.000 | 1.3 | 4.1 | 2.7 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 0 | 031 | 1111 | 0011 | 12032002 | 1000003476 | 006909 | 19024500000 | 0000375 | 12      |    |    |
| 0079 | 3   | 151 | 100   | 11   | 0.000 | 5.7 | 0.6 | 5.7 | 0   | 0   | 1.3  | 01 | 00 | 0   | 0    | 0 | 031 | 1111 | 0011 | 11032005 | 1000003476 | 007108 | 19024500000 | 0000375 | 12      |    |    |
| 0080 | 1   | 353 | 100   | 11   | 0.000 | 7.6 | 0.0 | 7.6 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 0000 | 0022 | 11042000 | 1000003476 | 051504 | 19024500000 | 0000375 | 12      |    |    |
| 0081 | 1   | 555 | 111   | 11   | 0.000 | 3.3 | 1.0 | 1.7 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 1 | 021 | 1121 | 0022 | 21092001 | 1000003476 | 076704 | 19024500000 | 0000113 | 12      |    |    |
| 0082 | 1   | 353 | 111   | 11   | 0.000 | 1.5 | 7.9 | 4.7 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 2 | 031 | 0000 | 1222 | 22032000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0083 | 1   | 131 | 111   | 11   | 0.000 | 1.4 | 1.5 | 1.4 | 1   | 0   | 0.0  | 02 | 00 | 0   | 0    | 1 | 031 | 0000 | 1221 | 22032000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0084 | 3   | 454 | 100   | 11   | 0.000 | 7.1 | 0.0 | 7.1 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 1 | 010 | 0000 | 2122 | 21052000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0085 | 3   | 151 | 100   | 11   | 0.000 | 3.9 | 0.0 | 3.9 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 1 | 010 | 1212 | 2122 | 21032002 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0086 | 3   | 454 | 100   | 11   | 0.000 | 4.3 | 0.0 | 4.3 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 1 | 010 | 1212 | 2122 | 21032002 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0087 | 1   | 131 | 111   | 11   | 0.000 | 0.6 | 1.5 | 1.2 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 0 | 031 | 1111 | 0021 | 21042003 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0088 | 1   | 111 | 111   | 11   | 0.000 | 1.2 | 1.1 | 1.2 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 0 | 031 | 1111 | 0021 | 21042001 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0089 | 1   | 721 | 200   | 11   | 0.000 | 3.0 | 0.0 | 3.0 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 1111 | 0021 | 21052004 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0090 | 1   | 353 | 100   | 11   | 0.000 | 1.2 | 0.0 | 1.2 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 2 | 031 | 0000 | 1322 | 11052000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0091 | 1   | 252 | 100   | 11   | 0.000 | 3.8 | 0.0 | 3.8 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 0000 | 0011 | 11072000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0092 | 1   | 151 | 131   | 11   | 0.000 | 0.5 | 2.4 | 1.8 | 1   | 0   | 0.0  | 03 | 00 | 0   | 0    | 1 | 021 | 0000 | 1221 | 22092000 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0093 | 1   | 131 | 100   | 11   | 0.000 | 4.7 | 0.0 | 4.7 | 0   | 0   | 0.0  | 01 | 00 | 0   | 0    | 0 | 031 | 1121 | 0011 | 23032001 | 1000003476 | 077609 | 19024500000 | 0000113 | 12      |    |    |
| 0094 | 1   | 151 |       |      |       |     |     |     |     |     |      |    |    |     |      |   |     |      |      |          |            |        |             |         |         |    |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE | TIME  | R D | TIM | TRG | 2ND | POSN | R M | OTHR | MSUM | O | A | NO | REEL | FRAME | DATE | BN       | B          | R      | REG         | DIV     | AO |
|------|-----|-----|-------|------|-------|-----|-----|-----|-----|------|-----|------|------|---|---|----|------|-------|------|----------|------------|--------|-------------|---------|----|
|      | FSP | M   | A     | T    | 1ST   | SUB | ALL | H   | R   | POS  | PUL | FS   | M    | A | D | E  | C    | F     | VZHN | AN       | S          |        |             |         |    |
| 0099 | 1   | 256 | 111   | 11   | 0.000 | 0.5 | 0.8 | 0.7 | 1   | 1    | 2.5 | 03   | 00   | 0 | 0 | 1  | 022  | 1121  | 1222 | 22072103 | 1000004037 | 007500 | 27034500000 | 0000325 | 12 |
| 0100 | 1   | 156 | 111   | 11   | 0.000 | 0.8 | 0.3 | 0.5 | 1   | 0    | 1.1 | 03   | 00   | 0 | 0 | 1  | 122  | 1111  | 1222 | 11072102 | 1000004037 | 009710 | 27034500000 | 0000325 | 12 |
| 0101 | 1   | 252 | 141   | 11   | 0.000 | 2.7 | 5.1 | 3.9 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 1  | 033  | 1111  | 1322 | 11062002 | 1000004970 | 039607 | 13074500000 | 0000320 | 12 |
| 0102 | 1   | 752 | 211   | 52   | 2.300 | 0.9 | 0.8 | 0.8 | 1   | 0    | 2.5 | 06   | 00   | 0 | 0 | 1  | 033  | 1111  | 1322 | 11052001 | 1000004970 | 041905 | 13074500000 | 0000320 | 12 |
| 0103 | 1   | 111 | 111   | 21   | 0.000 | 2.3 | 1.1 | 1.7 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 2  | 031  | 0000  | 1321 | 13062000 | 1000004970 | 054605 | 13074500000 | 0000320 | 12 |
| 0104 | 1   | 754 | 211   | 11   | 0.000 | 0.6 | 1.4 | 1.1 | 1   | 0    | 0.0 | 03   | 00   | 0 | 0 | 1  | 031  | 1122  | 1221 | 22092001 | 1000004825 | 054902 | 15064500000 | 0000075 | 12 |
| 0105 | 1   | 151 | 111   | 11   | 0.000 | 0.7 | 2.0 | 1.6 | 1   | 1    | 1.2 | 03   | 00   | 0 | 0 | 2  | 110  | 1111  | 0022 | 11092001 | 1000004768 | 027609 | 30054500000 | 0000375 | 12 |
| 0106 | 1   | 751 | 211   | 11   | 0.000 | 0.9 | 2.0 | 1.7 | 1   | 1    | 5.3 | 04   | 00   | 0 | 0 | 2  | 010  | 1111  | 0022 | 11082002 | 1000004768 | 027706 | 30054500000 | 0000375 | 12 |
| 0107 | 1   | 751 | 211   | 11   | 0.000 | 4.1 | 0.6 | 1.8 | 1   | 1    | 3.8 | 01   | 00   | 0 | 0 | 2  | 110  | 1111  | 0022 | 11092003 | 1000004768 | 027501 | 30054500000 | 0000375 | 12 |
| 0108 | 1   | 151 | 100   | 11   | 0.000 | 1.0 | 0.0 | 1.0 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 1  | 010  | 1112  | 0022 | 21032007 | 1000004768 | 075015 | 30054500000 | 0000375 | 12 |
| 0109 | 1   | 454 | 100   | 11   | 0.000 | 1.2 | 0.0 | 1.2 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 0  | 032  | 1111  | 0022 | 21032003 | 1000004768 | 090600 | 30054500000 | 0000375 | 12 |
| 0110 | 1   | 752 | 200   | 11   | 0.000 | 4.3 | 0.0 | 4.3 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 0  | 022  | 1111  | 0022 | 21032002 | 1000004768 | 090600 | 30054500000 | 0000375 | 12 |
| 0111 | 1   | 252 | 100   | 11   | 0.000 | 1.0 | 0.0 | 1.0 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 1  | 022  | 1121  | 1322 | 13062008 | 1000004765 | 018411 | 00000000000 | 1450375 | 12 |
| 0112 | 1   | 151 | 132   | 21   | 0.000 | 0.6 | 2.2 | 1.9 | 2   | 2    | 0.0 | 05   | 00   | 0 | 0 | 1  | 021  | 1111  | 1222 | 11052002 | 1000004630 | 000210 | 27054500000 | 0000355 | 12 |
| 0113 | 1   | 751 | 200   | 11   | 0.000 | 1.2 | 0.0 | 1.2 | 0   | 2    | 0.0 | 01   | 00   | 0 | 0 | 1  | 021  | 1111  | 1222 | 11042001 | 1000004630 | 000210 | 27054500000 | 0000355 | 12 |
| 0114 | 1   | 151 | 100   | 11   | 0.000 | 3.0 | 0.0 | 3.0 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 1  | 010  | 1121  | 1212 | 12062003 | 1000004423 | 029109 | 30044500000 | 0000113 | 11 |
| 0115 | 1   | 151 | 111   | 52   | 2.500 | 1.9 | 2.5 | 2.2 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 1  | 010  | 0000  | 1212 | 12032000 | 1000004423 | 030700 | 30044500000 | 0000113 | 11 |
| 0116 | 3   | 151 | 111   | 21   | 0.000 | 0.8 | 1.2 | 1.0 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 0  | 010  | 1111  | 0022 | 11032003 | 1000004423 | 038206 | 30044500000 | 0000113 | 11 |
| 0117 | 3   | 111 | 100   | 11   | 0.000 | 1.6 | 0.0 | 1.6 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 0  | 021  | 1111  | 0021 | 12032002 | 1000004423 | 038206 | 30044500000 | 0000113 | 11 |
| 0118 | 3   | 111 | 111   | 11   | 0.000 | 5.6 | 2.5 | 4.1 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 6  | 031  | 1111  | 1221 | 11072001 | 1000004184 | 010306 | 30044500000 | 0300035 | 11 |
| 0119 | 3   | 353 | 100   | 11   | 0.000 | 4.5 | 0.0 | 4.5 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 6  | 031  | 1111  | 1221 | 11082002 | 1000004184 | 011613 | 30044500000 | 0300035 | 11 |
| 0120 | 3   | 131 | 111   | 11   | 0.000 | 0.9 | 0.7 | 0.8 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 6  | 031  | 1111  | 1221 | 11082003 | 1000004184 | 011613 | 30044500000 | 0300035 | 11 |
| 0121 | 1   | 757 | 241   | 11   | 0.000 | 0.0 | 1.4 | 1.2 | 3   | 0    | 0.0 | 06   | 00   | 0 | 0 | 2  | 210  | 1111  | 1322 | 11062012 | 1000004184 | 025213 | 30044500000 | 0300035 | 11 |
| 0122 | 1   | 757 | 200   | 11   | 0.000 | 0.0 | 0.0 | 0.0 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 2  | 210  | 1111  | 1322 | 11062011 | 1000004184 | 025611 | 30044500000 | 0300035 | 11 |
| 0123 | 1   | 757 | 200   | 11   | 0.000 | 0.0 | 0.0 | 0.0 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 2  | 210  | 1111  | 1322 | 11062001 | 1000004184 | 025611 | 30044500000 | 0300035 | 11 |
| 0124 | 1   | 751 | 200   | 11   | 0.000 | 2.2 | 0.0 | 2.2 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 1  | 010  | 1121  | 1222 | 11082002 | 1000003960 | 068614 | 12044500000 | 1340355 | 11 |
| 0125 | 1   | 256 | 100   | 21   | 0.000 | 1.8 | 0.0 | 1.8 | 0   | 0    | 6.0 | 01   | 00   | 0 | 0 | 0  | 031  | 0000  | 0011 | 12072000 | 1000003923 | 000902 | 05044500244 | 0040000 | 11 |
| 0126 | 1   | 151 | 111   | 11   | 0.000 | 1.0 | 0.8 | 0.9 | 1   | 1    | 0.6 | 03   | 00   | 0 | 0 | 1  | 110  | 1122  | 1212 | 11032003 | 1000003923 | 022512 | 05044500244 | 0040000 | 11 |
| 0127 | 1   | 131 | 111   | 21   | 0.000 | 0.7 | 1.5 | 1.3 | 1   | 0    | 0.0 | 03   | 00   | 0 | 0 | 1  | 031  | 1111  | 1211 | 12072001 | 1000003923 | 022512 | 05044500244 | 0040000 | 11 |
| 0128 | 1   | 751 | 211   | 21   | 0.000 | 0.4 | 1.0 | 0.7 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 1  | 010  | 1122  | 1122 | 21072003 | 1000009627 | 021109 | 00000000000 | 0000000 | 22 |
| 0129 | 1   | 751 | 211   | 11   | 0.000 | 1.5 | 1.0 | 1.3 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 0  | 010  | 1122  | 0022 | 12042002 | 1000009589 | 001200 | 00000000000 | 0000000 | 22 |
| 0130 | 1   | 151 | 111   | 21   | 0.000 | 0.5 | 0.1 | 0.3 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 0  | 022  | 1111  | 0022 | 12032001 | 1000009589 | 003907 | 00004400000 | 0000000 | 22 |
| 0131 | 1   | 555 | 122   | 11   | 0.000 | 5.6 | 0.0 | 5.6 | 0   | 0    | 0.0 | 05   | 00   | 0 | 0 | 4  | 031  | 1121  | 1322 | 12032003 | 1000009589 | 063907 | 00004400000 | 0000000 | 22 |
| 0132 | 3   | 151 | 100   | 11   | 0.000 | 3.3 | 3.7 | 3.5 | 1   | 1    | 0.0 | 01   | 00   | 0 | 0 | 0  | 031  | 1121  | 1322 | 11062003 | 1000004417 | 014502 | 01054500015 | 1510385 | 11 |
| 0133 | 1   | 151 | 111   | 11   | 0.000 | 3.3 | 3.7 | 3.5 | 1   | 1    | 0.7 | 02   | 00   | 0 | 0 | 0  | 010  | 1121  | 0022 | 11102005 | 1000004417 | 035207 | 01054500015 | 1510385 | 11 |
| 0134 | 3   | 151 | 111   | 11   | 0.000 | 1.4 | 0.7 | 1.0 | 1   | 0    | 2.5 | 02   | 00   | 0 | 0 | 3  | 031  | 1121  | 1321 | 22032001 | 1000004217 | 047209 | 18044500000 | 3971005 | 11 |
| 0135 | 1   | 252 | 111   | 11   | 0.000 | 2.2 | 0.9 | 1.3 | 1   | 0    | 0.0 | 03   | 00   | 0 | 0 | 2  | 010  | 1111  | 1212 | 11092002 | 1000009743 | 006308 | 29044500000 | 0000000 | 11 |
| 0136 | 1   | 252 | 111   | 21   | 0.000 | 1.8 | 1.4 | 1.5 | 1   | 1    | 0.0 | 05   | 00   | 0 | 0 | 2  | 010  | 1111  | 1212 | 11092008 | 1000009743 | 006308 | 29044500000 | 0000000 | 11 |
| 0137 | 1   | 252 | 100   | 21   | 0.000 | 0.6 | 0.0 | 0.6 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 2  | 010  | 1121  | 1212 | 11072001 | 1000009743 | 003907 | 29044500000 | 0000000 | 11 |
| 0138 | 1   | 252 | 100   | 11   | 0.000 | 2.1 | 0.0 | 2.1 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 2  | 010  | 0000  | 1211 | 12072000 | 1000009743 | 039304 | 29044500000 | 0000000 | 11 |
| 0139 | 1   | 151 | 311   | 52   | 1.400 | 0.9 | 0.8 | 0.8 | 2   | 0    | 0.0 | 07   | 00   | 0 | 1 | 3  | 022  | 1111  | 1322 | 12052001 | 1000010429 | 029500 | 12094400000 | 0000000 | 11 |
| 0140 | 1   | 252 | 111   | 11   | 0.000 | 1.3 | 1.5 | 1.4 | 1   | 0    | 0.0 | 02   | 00   | 0 | 0 | 0  | 010  | 1112  | 0022 | 11072002 | 1000010429 | 029313 | 12094400000 | 0000000 | 11 |
| 0141 | 3   | 151 | 111   | 11   | 0.000 | 0.4 | 0.7 | 0.6 | 1   | 0    | 0.0 | 03   | 00   | 0 | 0 | 3  | 010  | 0000  | 1322 | 11052000 | 1000010434 | 030011 | 12094400000 | 0000000 | 11 |
| 0142 | 1   | 151 | 111   | 21   | 0.000 | 1.0 | 3.9 | 2.4 | 2   | 1    | 0.0 | 02   | 00   | 0 | 0 | 1  | 010  | 0000  | 1212 | 13062000 | 1000010434 | 036800 | 08084400035 | 3150855 | 11 |
| 0143 | 1   | 151 | 111   | 52   | 6.500 | 1.0 | 3.9 | 2.4 | 2   | 1    | 0.0 | 02   | 00   | 0 | 0 | 2  | 010  | 1121  | 1211 | 13062002 | 1000010434 | 036403 | 08084400035 | 3150855 | 11 |
| 0144 | 1   | 151 | 100   | 21   | 0.000 | 0.9 | 0.0 | 0.9 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 2  | 010  | 1121  | 1212 | 22092004 | 1000010434 | 040100 | 08084400035 | 3150855 | 11 |
| 0145 | 3   | 151 | 100   | 52   | 4.000 | 0.4 | 0.0 | 0.7 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 7  | 010  | 0000  | 1321 | 11052000 | 1000003085 | 001200 | 07014500044 | 2000000 | 11 |
| 0146 | 3   | 111 | 100   | 11   | 0.000 | 0.4 | 0.0 | 0.4 | 0   | 0    | 0.0 | 01   | 00   | 0 | 0 | 7  | 010  | 1111  | 1321 | 11032003 | 1000003085 | 003210 | 07014500044 | 2000000 | 11 |
| 0147 | 3   | 151 | 100   | 11   | 0.000 | 1.5 | 0.0 | 1.5 | 0   | 0    | 3.0 | 01   | 00   | 0 | 0 | 7  | 010  | 1111  | 1321 | 11032003 | 1000003085 | 003011 | 07014500044 | 2000000 | 11 |

## SMALL ARMS EFFECTIVENESS DATA

| LSN 0                   | POS AIM         | RD/ 16 | FIRE TIME     | R D TIM | TKG 2ND POSN | R M       | OTHR MSUM | U          | A NO       | REEL       | FRAME      | DATE       | BN B | DIV | AO   |
|-------------------------|-----------------|--------|---------------|---------|--------------|-----------|-----------|------------|------------|------------|------------|------------|------|-----|------|
| FSP M                   | W RUR R         | A      | T 1ST SUB ALL | C I TO  | H R POS      | G E       | C U OTHA  | V R        | AN S       |            |            |            | R    | REG | B MC |
| 0148 3 151 100 11 0.000 | 2.2 0.0 2.2 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 00       | 0.010     | 0000 0022 | 13012000   | 1000003085 | 005412     | 0701450004 | 2000000 11 |      |     |      |
| 0149 3 252 100 11 0.000 | 3.7 0.0 3.7 0 0 | 1.6 01 | 0.0 04        | 0.0 04  | 0.0 010      | 1121 0022 | 11032004  | 1000003085 | 006208     | 0701450004 | 2000000 11 |            |      |     |      |
| 0150 3 151 111 11 0.000 | 0.7 1.8 1.5 1 0 | 0.0 04 | 0.0 04        | 0.0 04  | 0.0 010      | 1112 0022 | 11092001  | 1000003085 | 007711     | 0701450004 | 2000000 11 |            |      |     |      |
| 0151 3 252 111 11 0.000 | 1.1 1.6 1.4 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 010      | 1112 0022 | 11092003  | 1000003085 | 007711     | 0701450004 | 2000000 11 |            |      |     |      |
| 0152 3 252 111 11 0.000 | 2.5 2.1 2.3 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 010      | 1112 0022 | 11092004  | 1000003085 | 008008     | 0701450004 | 2000000 11 |            |      |     |      |
| 0153 3 252 111 11 0.000 | 2.3 5.0 4.1 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 032      | 0000 0022 | 13092000  | 1000003085 | 014002     | 0701450004 | 2000000 11 |            |      |     |      |
| 0154 3 151 111 11 0.000 | 0.3 0.4 0.4 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 010      | 0000 1322 | 12052000  | 1000003085 | 025910     | 0701450004 | 2000000 11 |            |      |     |      |
| 0155 3 252 111 11 0.000 | 0.8 1.8 1.5 1 0 | 0.0 04 | 0.0 04        | 0.0 04  | 0.0 010      | 1122 1322 | 11072004  | 1000003085 | 027000     | 0701450004 | 2000000 11 |            |      |     |      |
| 0156 1 252 100 41 0.002 | 0.3 0.0 0.3 0 1 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 010      | 1111 1322 | 11092001  | 1000048136 | 016601     | 2008642000 | 0000077 14 |            |      |     |      |
| 0157 1 252 100 41 0.002 | 0.8 0.0 0.9 0 1 | 1.2 01 | 0.0 01        | 0.0 01  | 0.0 110      | 1111 1322 | 11092101  | 1000048136 | 021914     | 2008642000 | 0000077 14 |            |      |     |      |
| 0158 1 252 111 41 0.002 | 1.2 0.7 0.9 1 1 | 0.5 03 | 0.0 01        | 0.0 01  | 0.0 210      | 1111 1322 | 11092103  | 1000048136 | 022812     | 2008642000 | 0000077 14 |            |      |     |      |
| 0159 1 252 100 4210.012 | 0.0 0.0 4.7 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 102      | 0000 0022 | 21072000  | 1000052867 | 016505     | 1804680000 | 0000255 14 |            |      |     |      |
| 0160 1 252 111 41 0.002 | 1.6 1.0 1.1 2 0 | 0.0 05 | 0.0 04        | 0.0 04  | 0.0 102      | 0000 0022 | 23042000  | 1000052867 | 016601     | 1804680000 | 0000255 14 |            |      |     |      |
| 0161 1 252 111 41 0.002 | 1.4 0.4 0.7 1 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 102      | 0000 0022 | 23052000  | 1000052867 | 017735     | 1804680000 | 0000255 14 |            |      |     |      |
| 0162 1 252 400 42 5.002 | 0.3 0.0 1.8 0 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 102      | 0000 0022 | 22071000  | 1000052867 | 017735     | 1804680000 | 0000255 14 |            |      |     |      |
| 0163 1 752 211 42 4.002 | 1.4 2.2 1.8 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 102      | 1121 1222 | 21032002  | 1000052867 | 017735     | 1804680000 | 0000255 14 |            |      |     |      |
| 0164 1 751 200 41 0.002 | 0.0 0.0 2.4 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 101      | 1121 0022 | 11041001  | 1000054913 | 019604     | 1804680000 | 0000255 14 |            |      |     |      |
| 0165 3 752 511 42 2.502 | 0.6 1.1 0.9 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 102      | 1111 0022 | 12042001  | 1000054913 | 033203     | 2902680000 | 0000255 14 |            |      |     |      |
| 0166 3 751 200 41 0.002 | 0.7 0.0 0.7 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 102      | 0000 0022 | 13032000  | 1000054913 | 033203     | 2902680000 | 0000255 14 |            |      |     |      |
| 0167 1 755 231 42 3.502 | 0.3 3.9 2.1 1 0 | 0.0 02 | 0.0 04        | 0.0 04  | 0.0 101      | 0000 1222 | 11042000  | 1000051335 | 035306     | 2604672005 | 0310000 14 |            |      |     |      |
| 0168 3 141 411 62 3.300 | 0.0 3.5 2.6 1 0 | 0.0 04 | 0.0 04        | 0.0 04  | 0.0 303      | 0000 0021 | 13052000  | 1000051350 | 024510     | 1103670000 | 0000000 14 |            |      |     |      |
| 0169 3 136 100 41 0.002 | 0.5 0.0 0.5 0 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 303      | 1111 0021 | 13102001  | 1000051350 | 024510     | 1103670000 | 0000000 14 |            |      |     |      |
| 0170 3 353 111 41 0.002 | 0.7 2.0 1.6 1 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 303      | 1111 0021 | 13032002  | 1000051350 | 024510     | 1103670000 | 0000000 14 |            |      |     |      |
| 0171 1 353 111 42 4.002 | 0.8 5.9 3.4 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 102      | 1111 0022 | 23032003  | 1000050869 | 064200     | 0402670000 | 0000000 14 |            |      |     |      |
| 0172 1 353 100 42 2.002 | 6.0 0.0 6.2 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 102      | 1111 0022 | 23032001  | 1000050869 | 064200     | 0402670000 | 0000000 14 |            |      |     |      |
| 0173 3 343 111 6212.000 | 0.0 2.4 1.9 3 0 | 0.0 05 | 0.0 05        | 0.0 05  | 0.0 203      | 1121 1322 | 12042003  | 1000049957 | 028604     | 1801662000 | 0000015 14 |            |      |     |      |
| 0174 1 151 111 32 4.000 | 1.0 2.5 1.8 1 0 | 0.7 02 | 0.0 02        | 0.0 02  | 0.0 010      | 1112 0022 | 11092002  | 1000049957 | 062504     | 1801662000 | 0000015 14 |            |      |     |      |
| 0175 1 151 111 31 0.000 | 1.0 0.6 0.7 1 0 | 0.7 05 | 0.0 05        | 0.0 05  | 0.0 010      | 1112 0022 | 11092005  | 1000049957 | 062505     | 1801662000 | 0000015 14 |            |      |     |      |
| 0176 3 741 200 62 5.000 | 0.0 0.0 1.8 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 402      | 1121 0021 | 21032004  | 1000054141 | 068200     | 1303692000 | 0040255 14 |            |      |     |      |
| 0177 3 751 200 42 2.002 | 0.1 0.0 0.5 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 402      | 1121 0021 | 21032003  | 1000054141 | 068907     | 1303692000 | 0040255 14 |            |      |     |      |
| 0178 1 343 200 62 9.000 | 0.8 0.0 0.5 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 402      | 1121 0021 | 22072001  | 1000054552 | 048317     | 3101680000 | 0470095 14 |            |      |     |      |
| 0179 1 111 100 41 0.002 | 0.8 0.0 4.1 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 101      | 1111 1222 | 21091004  | 1000054552 | 048536     | 3101680000 | 0470095 14 |            |      |     |      |
| 0180 1 111 100 41 0.002 | 0.1 1.0 0.7 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 102      | 1111 1322 | 23051002  | 1000054552 | 050936     | 3101680000 | 0470095 14 |            |      |     |      |
| 0181 3 434 111 62 7.000 | 0.2 2.3 1.6 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 403      | 1121 1321 | 11021004  | 1000051699 | 037205     | 2609670000 | 0000095 14 |            |      |     |      |
| 0182 3 232 100 62 3.000 | 0.7 0.0 1.5 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 403      | 1121 1321 | 12031005  | 1000051699 | 036001     | 2609670000 | 0000095 14 |            |      |     |      |
| 0183 1 151 100 41 0.002 | 2.0 0.0 2.0 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 202      | 1121 1322 | 12062002  | 1000051699 | 036001     | 2609670000 | 0000095 14 |            |      |     |      |
| 0184                    |                 |        |               |         |              |           |           |            |            |            |            |            |      |     |      |
| 0185 3 353 100 42 3.002 | 3.9 0.0 4.4 0 0 | 1.7 01 | 0.0 03        | 0.0 03  | 0.0 101      | 0000 1212 | 13071000  | 1000052643 | 002700     | 3101680000 | 0000000 14 |            |      |     |      |
| 0186 3 151 111 32 2.000 | 0.9 1.5 1.3 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 203      | 1111 0011 | 22041003  | 1000052643 | 004100     | 3101680000 | 0000000 14 |            |      |     |      |
| 0187 1 141 211 62 5.000 | 1.2 6.1 3.6 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 102      | 0000 0021 | 22051000  | 1000051805 | 057212     | 2107670000 | 0000255 14 |            |      |     |      |
| 0188 1 111 100 42 3.002 | 4.2 0.0 5.2 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 102      | 1121 1321 | 22051002  | 1000051805 | 062205     | 2107670000 | 0000255 14 |            |      |     |      |
| 0189 1 141 211 62 2.000 | 1.3 1.7 1.6 1 0 | 0.0 05 | 0.0 05        | 0.0 05  | 0.0 402      | 0000 1321 | 23042000  | 1000051805 | 064930     | 2107670000 | 0000255 14 |            |      |     |      |
| 0190 3 151 100 31 0.000 | 0.2 0.0 0.2 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 010      | 1122 0022 | 13092002  | 1000051824 | 001236     | 0204670000 | 0000095 14 |            |      |     |      |
| 0191 3 252 200 41 0.002 | 1.5 0.0 1.5 0 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 010      | 0000 0022 | 21031000  | 1000051826 | 051603     | 2807670005 | 0390095 14 |            |      |     |      |
| 0192 3 252 111 41 0.002 | 1.0 0.5 0.8 1 0 | 6.2 02 | 0.0 02        | 0.0 02  | 0.0 202      | 0000 1321 | 12061000  | 1000052788 | 051600     | 0904682000 | 0000019 14 |            |      |     |      |
| 0193 3 111 111 42 2.502 | 0.2 3.1 1.7 1 0 | 0.0 02 | 0.0 02        | 0.0 02  | 0.0 302      | 0000 1321 | 12031000  | 1000052788 | 051817     | 0904682000 | 0000019 14 |            |      |     |      |
| 0194 3 343 100 6231.000 | 0.0 0.012.5 0   | 0.0 06 | 0.0 06        | 0.0 06  | 0.0 703      | 1121 1322 | 12032002  | 1000052788 | 054007     | 0904682000 | 0000019 14 |            |      |     |      |
| 0195 3 751 211 41 0.002 | 1.2 0.8 0.9 1 0 | 0.0 01 | 0.0 01        | 0.0 01  | 0.0 010      | 1122 0022 | 12031001  | 1000052788 | 056313     | 0904682000 | 0000019 14 |            |      |     |      |
| 0196 3 343 111 62 3.000 | 0.4 3.9 2.7 1 0 | 0.0 03 | 0.0 03        | 0.0 03  | 0.0 032      | 1121 0022 | 13032004  | 1000052788 | 056910     | 0904682000 | 0000019 14 |            |      |     |      |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | QD/16 | FIRE TIME | R D  | TIM   | TRG | 2ND | POSN  | R M  | OTH | MSUM | O    | A NO | REEL | FRAME | DATE | BN       | B         | DIV    | AO          |         |    |
|------|-----|-----|-------|-----------|------|-------|-----|-----|-------|------|-----|------|------|------|------|-------|------|----------|-----------|--------|-------------|---------|----|
| FSP  | M   | A   | T     | 1ST       | SUB  | ALL   | HR  | FS  | M A D | E    | C   | F    | VZBN | R    | AN S |       | R    | R        | REG       | B      | MC          |         |    |
| 0197 | 1   | 343 | 111   | 6215.000  | 2.0  | 5.1   | 4.1 | 1.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 2    | 033  | 1111  | 0022 | 23032001 | 100050883 | 043305 | 08016700000 | 0000015 | 14 |
| 0198 | 1   | 252 | 111   | 41 0.002  | 1.1  | 0.6   | 0.7 | 1.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 2    | 032  | 1111  | 0022 | 21022001 | 100050883 | 045207 | 08016700000 | 0000015 | 14 |
| 0199 | 1   | 151 | 200   | 42 2.002  | 0.6  | 0.0   | 0.7 | 0.2 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 021  | 1121  | 1222 | 11092001 | 100050933 | 068708 | 26016700000 | 0000000 | 14 |
| 0200 | 3   | 752 | 600   | 6280.000  | 0.5  | 0.011 | 2.0 | 0.0 | 0.0   | 0.0  | 0.0 | 0.0  | 0.0  | 3    | 010  | 1122  | 1322 | 12032002 | 100050962 | 005801 | 10016700000 | 0000255 | 14 |
| 0201 | 1   | 752 | 200   | 42 2.001  | 0.8  | 0.0   | 1.0 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 032  | 0000  | 0022 | 11032000 | 100051034 | 003300 | 22026700000 | 0000255 | 14 |
| 0202 | 1   | 751 | 211   | 62 3.300  | 0.2  | 2.7   | 1.9 | 1.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 2    | 010  | 1122  | 1322 | 11092001 | 100051184 | 045604 | 13046700000 | 0000095 | 14 |
| 0203 | 1   | 151 | 111   | 41 0.001  | 0.4  | 2.6   | 1.9 | 1.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 3    | 010  | 0000  | 1322 | 12051000 | 100051184 | 046503 | 13046700000 | 0000095 | 14 |
| 0204 | 1   | 454 | 111   | 41 0.002  | 0.2  | 1.6   | 0.9 | 1.0 | 0.0   | 0.2  | 0.0 | 0.0  | 0.0  | 3    | 031  | 1111  | 1321 | 13042001 | 100051183 | 051107 | 13046700000 | 0000095 | 14 |
| 0205 | 1   | 744 | 211   | 62 3.500  | 1.0  | 1.8   | 1.6 | 1.0 | 0.0   | 0.4  | 0.0 | 0.0  | 0.0  | 0    | 022  | 1121  | 0022 | 11032201 | 100052121 | 017208 | 23096720015 | 0080019 | 14 |
| 0206 | 1   | 752 | 200   | 6215.000  | 0.0  | 0.0   | 3.9 | 0.2 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 7    | 010  | 0000  | 1321 | 23052000 | 100052811 | 020701 | 05056800000 | 0000000 | 14 |
| 0207 | 1   | 754 | 200   | 42 3.001  | 0.8  | 0.0   | 1.4 | 0.2 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 7    | 010  | 0000  | 1321 | 22061000 | 100052811 | 046804 | 05056800000 | 0000000 | 14 |
| 0208 | 3   | 252 | 100   | 42 4.002  | 0.2  | 0.0   | 1.3 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 0    | 031  | 0000  | 0022 | 13032000 | 100052437 | 023213 | 28126700025 | 0350045 | 14 |
| 0209 | 3   | 454 | 122   | 41 0.002  | 0.8  | 3.1   | 2.3 | 3.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 6    | 010  | 1122  | 1222 | 11032003 | 100050512 | 012508 | 06096620175 | 0001015 | 14 |
| 0210 | 3   | 555 | 100   | 41 0.002  | 5.3  | 0.0   | 5.3 | 0.0 | 0.0   | 0.0  | 0.0 | 0.0  | 0.0  | 6    | 010  | 0000  | 1322 | 11062000 | 100050512 | 013605 | 06096620175 | 0001015 | 14 |
| 0211 | 1   | 151 | 111   | 31 0.000  | 0.3  | 1.4   | 1.1 | 1.0 | 0.0   | 0.4  | 0.0 | 0.0  | 0.0  | 1    | 022  | 0000  | 0022 | 12092000 | 100050697 | 065315 | 10056600015 | 0180015 | 14 |
| 0212 | 3   | 252 | 100   | 32 4.000  | 0.2  | 0.0   | 0.9 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 031  | 0000  | 1222 | 21062000 | 100050697 | 066314 | 10056600015 | 0180015 | 14 |
| 0213 | 3   | 252 | 100   | 42 5.002  | 0.5  | 0.0   | 1.8 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 2    | 010  | 1121  | 0022 | 12092001 | 100050697 | 067109 | 10056600015 | 0180015 | 24 |
| 0214 | 3   | 555 | 111   | 41 0.002  | 1.6  | 0.7   | 0.8 | 1.0 | 0.0   | 0.13 | 0.0 | 0.0  | 0.0  | 2    | 010  | 1111  | 1322 | 21091001 | 100054059 | 020612 | 20026920000 | 0000000 | 14 |
| 0215 | 3   | 232 | 111   | 41 0.002  | 20.0 | 1.5   | 7.7 | 1.0 | 0.0   | 0.3  | 0.0 | 0.0  | 0.0  | 2    | 031  | 0000  | 1321 | 23042000 | 100054059 | 023633 | 20026920000 | 0000000 | 14 |
| 0216 | 3   | 151 | 111   | 41 0.002  | 0.3  | 1.2   | 1.0 | 1.0 | 0.0   | 0.6  | 0.0 | 0.0  | 0.0  | 1    | 022  | 0000  | 1322 | 23062000 | 100054059 | 025316 | 20026920000 | 0000000 | 14 |
| 0217 | 3   | 151 | 100   | 41 0.002  | 0.2  | 0.0   | 0.2 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1222 | 12061000 | 100054006 | 025319 | 23026920000 | 0110000 | 14 |
| 0218 | 1   | 151 | 100   | 41 0.002  | 0.7  | 0.0   | 0.7 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1322 | 12072000 | 100054006 | 031017 | 23026920000 | 0110000 | 14 |
| 0219 | 1   | 751 | 200   | 41 0.002  | 0.3  | 0.0   | 0.3 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 122  | 1121  | 1322 | 12071002 | 100054358 | 021918 | 00046900000 | 0000255 | 14 |
| 0220 | 3   | 151 | 111   | 41 0.002  | 12.8 | 1.4   | 2.1 | 1.0 | 0.0   | 0.16 | 0.0 | 0.0  | 0.0  | 2    | 010  | 1121  | 1322 | 21051000 | 100053735 | 008028 | 25116900000 | 0000045 | 14 |
| 0221 | 1   | 753 | 211   | 42 3.002  | 1.5  | 4.4   | 3.0 | 1.0 | 0.0   | 0.2  | 0.0 | 0.0  | 0.0  | 1    | 022  | 0000  | 1212 | 11072000 | 100052556 | 019818 | 31016800000 | 0000255 | 14 |
| 0222 | 3   | 252 | 100   | 42 5.002  | 0.4  | 0.0   | 1.7 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 1    | 031  | 0000  | 0021 | 22052000 | 100052556 | 020310 | 31016800000 | 0000255 | 14 |
| 0223 | 3   | 252 | 111   | 41 0.002  | 1.4  | 0.9   | 0.9 | 1.0 | 0.0   | 0.09 | 0.0 | 0.0  | 0.0  | 2    | 021  | 0000  | 0011 | 13091000 | 100052556 | 021819 | 31016800000 | 0000255 | 14 |
| 0224 | 3   | 131 | 100   | 31 0.000  | 1.5  | 0.0   | 1.5 | 0.0 | 0.0   | 0.1  | 0.0 | 0.0  | 0.0  | 2    | 031  | 1121  | 0011 | 22092002 | 100052556 | 022321 | 31016800000 | 0000255 | 14 |
| 0225 | 1   | 353 | 111   | 41 0.002  | 0.5  | 1.2   | 1.0 | 1.0 | 0.0   | 0.06 | 0.0 | 0.0  | 0.0  | 0    | 010  | 0000  | 0022 | 12082000 | 100055495 | 024317 | 02037002303 | 0000000 | 14 |
| 0226 | 1   | 353 | 111   | 41 0.002  | 1.0  | 1.3   | 1.2 | 1.0 | 0.0   | 0.07 | 0.0 | 0.0  | 0.0  | 0    | 010  | 0000  | 0022 | 12091000 | 100055495 | 024317 | 02037002303 | 0000000 | 14 |
| 0227 | 1   | 353 | 111   | 41 0.002  | 1.0  | 0.9   | 0.9 | 1.0 | 0.0   | 0.07 | 0.0 | 0.0  | 0.0  | 0    | 010  | 0000  | 0022 | 11112000 | 100055495 | 026411 | 02037002303 | 0000000 | 14 |
| 0228 | 1   | 353 | 111   | 41 0.002  | 3.6  | 1.1   | 1.5 | 1.0 | 0.0   | 0.06 | 0.0 | 0.0  | 0.0  | 0    | 010  | 0000  | 0022 | 13091000 | 100055495 | 054930 | 02037002303 | 0000000 | 14 |
| 0229 | 1   | 151 | 100   | 31 0.000  | 0.7  | 0.0   | 0.3 | 0.0 | 0.0   | 0.01 | 0.0 | 0.0  | 0.0  | 2    | 010  | 1111  | 1212 | 11041001 | 100052554 | 010135 | 31016800000 | 0000015 | 14 |
| 0230 | 1   | 751 | 211   | 41 0.002  | 0.7  | 0.2   | 0.5 | 1.0 | 0.0   | 0.02 | 0.0 | 0.0  | 0.0  | 1    | 110  | 1122  | 1222 | 11031002 | 100054628 | 020933 | 03036700015 | 0260015 | 14 |
| 0231 | 1   | 751 | 211   | 41 0.002  | 1.3  | 0.7   | 0.9 | 1.2 | 0.0   | 0.03 | 0.0 | 0.0  | 0.0  | 1    | 010  | 1122  | 1222 | 11031002 | 100054628 | 021035 | 03036700015 | 0260015 | 14 |
| 0232 | 1   | 751 | 211   | 31 0.000  | 0.7  | 1.0   | 0.9 | 1.0 | 0.0   | 0.03 | 0.0 | 0.0  | 0.0  | 1    | 021  | 1121  | 1222 | 21032002 | 100054628 | 028634 | 03036700015 | 0260015 | 14 |
| 0233 | 1   | 252 | 111   | 41 0.002  | 0.8  | 1.0   | 1.0 | 1.0 | 0.0   | 0.04 | 0.0 | 0.0  | 0.0  | 0    | 022  | 1111  | 0022 | 11031002 | 100054628 | 032511 | 03036700015 | 0260015 | 14 |
| 0234 | 1   | 152 | 100   | 41 0.002  | 0.6  | 0.0   | 0.6 | 0.0 | 0.0   | 0.01 | 0.0 | 0.0  | 0.0  | 0    | 010  | 1111  | 0022 | 11032002 | 100054628 | 032503 | 03036700015 | 0260015 | 14 |
| 0235 | 1   | 252 | 111   | 41 0.002  | 1.0  | 0.9   | 0.9 | 1.0 | 0.0   | 0.03 | 0.0 | 0.0  | 0.0  | 0    | 010  | 1111  | 0022 | 11032002 | 100054628 | 033503 | 03036700015 | 0260015 | 14 |
| 0236 | 1   | 151 | 100   | 41 0.002  | 1.6  | 0.0   | 1.6 | 0.0 | 0.0   | 0.01 | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1322 | 11042000 | 100052867 | 016215 | 18046800000 | 0000255 | 14 |
| 0237 | 1   | 754 | 200   | 42 8.012  | 0.6  | 0.0   | 3.0 | 0.0 | 0.0   | 0.01 | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1322 | 11041000 | 100052867 | 016514 | 18046800000 | 0000255 | 14 |
| 0238 | 1   | 454 | 111   | 42 2.302  | 1.7  | 2.0   | 1.9 | 1.0 | 0.0   | 0.03 | 0.0 | 0.0  | 0.0  | 1    | 022  | 0000  | 1222 | 23071000 | 100052867 | 016810 | 18046800000 | 0000255 | 14 |
| 0239 | 1   | 252 | 111   | 41 0.002  | 0.7  | 0.7   | 0.7 | 1.0 | 0.0   | 0.04 | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1222 | 23072000 | 100052867 | 017804 | 18046800000 | 0000255 | 14 |
| 0240 | 1   | 252 | 400   | 42 5.002  | 0.6  | 0.0   | 2.1 | 0.0 | 0.0   | 0.01 | 0.0 | 0.0  | 0.0  | 1    | 010  | 0000  | 1222 | 12052000 | 100052867 | 018026 | 18046800000 | 0000255 | 14 |
| 0241 | 1   | 752 | 211   | 42 3.502  | 1.2  | 2.5   | 1.9 | 1.0 | 0.0   | 0.02 | 0.0 | 0.0  | 0.0  | 1    | 021  | 1121  | 1222 | 11091002 | 100052867 | 019025 | 18046800000 | 0000255 | 14 |
| 0242 | 1   | 151 | 200   | 42        |      |       |     |     |       |      |     |      |      |      |      |       |      |          |           |        |             |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | W   | RO/16 | FIRE TIME | R D TIM | TRG 2ND POSN | R M    | OTHER | MSUM | Q     | A NO | REEL | FRAME | DATE | BN B | DIV  | AO   |          |            |            |            |            |            |         |    |
|------|-----|-----|-----|-------|-----------|---------|--------------|--------|-------|------|-------|------|------|-------|------|------|------|------|----------|------------|------------|------------|------------|------------|---------|----|
| FSP  | M   | A   | T   | IST   | SUB       | ALL     | H M POS      | C I TO | PUL   | FS   | M A D | E    | C    | F     | VZRN | R    | REG  | B MC |          |            |            |            |            |            |         |    |
| 0246 | 1   | 151 | 111 | 41    | 0.002     | 1.8     | 1.6          | 1.6    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 010  | 0000 | 0022 | 13032000 | 1000053425 | 042914     | 2509680000 | 0000255    | 14         |         |    |
| 0247 | 1   | 353 | 111 | 42    | 2.702     | 0.9     | 1.5          | 1.4    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 010  | 0000 | 0022 | 13072000 | 1000053425 | 044630     | 2509680000 | 0000255    | 14         |         |    |
| 0248 | 1   | 353 | 111 | 62    | 2.000     | 1.2     | 1.0          | 1.1    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 031  | 0000 | 0021 | 13092000 | 1000053425 | 045108     | 2509680000 | 0000255    | 14         |         |    |
| 0249 | 1   | 353 | 111 | 41    | 0.000     | 0.7     | 1.3          | 1.2    | 1     | 0    | 0.0   | 0.9  | 0    | 0     | 0    | 010  | 0000 | 0022 | 13102000 | 1000053425 | 046337     | 2509680000 | 0000255    | 14         |         |    |
| 0250 | 1   | 752 | 611 | 62    | 5.000     | 0.3     | 2.0          | 1.8    | 1     | 0    | 0.0   | 0.6  | 0    | 0     | 0    | 010  | 0000 | 0022 | 13092000 | 1000053425 | 047023     | 2509680000 | 0000255    | 14         |         |    |
| 0251 | 1   | 252 | 100 | 41    | 0.002     | 1.5     | 0.0          | 1.5    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 032  | 0000 | 0022     | 11092000   | 1000051299 | 038217     | 0705670000 | 0000255    | 14      |    |
| 0252 | 1   | 756 | 600 | 42    | 9.012     | 0.0     | 0.0          | 3.3    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 022  | 0000 | 1322     | 12062000   | 1000055231 | 049015     | 2510692000 | 0000255    | 14      |    |
| 0253 | 1   | 252 | 111 | 41    | 0.002     | 2.2     | 0.7          | 1.1    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 1    | 022  | 0000 | 1322     | 21062000   | 1000055231 | 050207     | 2510692000 | 0000825    | 14      |    |
| 0254 | 1   | 152 | 100 | 41    | 0.002     | 0.6     | 0.0          | 0.6    | 0     | 0    | 2.9   | 0.1  | 0    | 0     | 0    | 1    | 022  | 1111 | 1322     | 21062002   | 1000055231 | 051105     | 2510692000 | 0000825    | 14      |    |
| 0255 | 1   | 752 | 242 | 41    | 2.002     | 0.5     | 2.0          | 1.7    | 3     | 0    | 0.0   | 0.4  | 10   | 1     | 2    | 0    | 1    | 022  | 0000     | 1322       | 22032000   | 1000055231 | 052508     | 2510692000 | 0000825 | 14 |
| 0256 | 1   | 152 | 100 | 41    | 0.002     | 0.4     | 0.0          | 0.4    | 0     | 0    | 2.9   | 0.1  | 0    | 0     | 0    | 1    | 022  | 0000 | 1322     | 22062000   | 1000055231 | 053630     | 2510692000 | 0000825    | 14      |    |
| 0257 | 1   | 212 | 111 | 62    | 4.300     | 4.2     | 1.2          | 1.7    | 1     | 0    | 0.0   | 0.6  | 0    | 0     | 0    | 0    | 031  | 1121 | 0022     | 11052002   | 2000004049 | 029105     | 0609660000 | 0000035    | 24      |    |
| 0258 | 3   | 353 | 111 | 41    | 0.002     | 0.6     | 4.1          | 2.4    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 2    | 010  | 0000 | 0012     | 13112000   | 2000002804 | 003017     | 0002680000 | 0000000    | 24      |    |
| 0259 | 3   | 151 | 122 | 41    | 1.602     | 1.9     | 1.6          | 1.7    | 3     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 021  | 0000 | 1211     | 12071000   | 2000002804 | 007420     | 0002680000 | 0000000    | 24      |    |
| 0260 | 1   | 751 | 200 | 42    | 8.002     | 0.0     | 0.0          | 2.7    | 0     | 2    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 031  | 1111 | 1122     | 11032001   | 2000002859 | 006720     | 2612670000 | 0000035    | 24      |    |
| 0261 | 1   | 751 | 200 | 62    | 13.000    | 0.0     | 0.0          | 1.5    | 0     | 2    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 031  | 1111 | 1122     | 11031002   | 2000002859 | 006720     | 2612670000 | 0000035    | 24      |    |
| 0262 | 1   | 151 | 100 | 31    | 0.000     | 1.6     | 0.0          | 1.6    | 0     | 0    | 0.2   | 0.1  | 0    | 0     | 0    | 1    | 110  | 1122 | 1322     | 13062001   | 2000003688 | 012005     | 1109650000 | 0000035    | 24      |    |
| 0263 | 3   | 353 | 100 | 31    | 0.000     | 1.7     | 0.0          | 1.7    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 032  | 0000 | 0022     | 12032000   | 2000003688 | 016510     | 1109650000 | 0000035    | 24      |    |
| 0264 | 3   | 343 | 111 | 62    | 7.600     | 7.3     | 1.7          | 2.8    | 1     | 0    | 0.0   | 0.5  | 0    | 0     | 0    | 2    | 021  | 1121 | 1321     | 12052001   | 2000003688 | 017330     | 1109650000 | 0000035    | 24      |    |
| 0265 | 3   | 242 | 111 | 62    | 11.500    | 3.4     | 3.2          | 3.3    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 0    | 031  | 1121 | 0021     | 12032001   | 2000003688 | 018216     | 1109650000 | 0000035    | 24      |    |
| 0266 | 3   | 242 | 111 | 62    | 4.500     | 0.1     | 4.1          | 2.1    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 0    | 021  | 1121 | 0021     | 13032001   | 2000003688 | 018720     | 1109650000 | 0000035    | 24      |    |
| 0267 | 3   | 343 | 122 | 62    | 4.300     | 0.2     | 2.5          | 1.7    | 1     | 0    | 0.0   | 0.3  | 0    | 0     | 0    | 0    | 031  | 0000 | 0022     | 13011000   | 2000003690 | 030610     | 0911650000 | 0000035    | 24      |    |
| 0268 | 3   | 343 | 190 | 62    | 4.000     | 0.1     | 0.0          | 0.2    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 031  | 1111 | 0022     | 13011002   | 2000003690 | 031515     | 0911650000 | 0000000    | 24      |    |
| 0269 | 1   | 252 | 111 | 41    | 0.002     | 1.7     | 0.5          | 1.1    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 1    | 031  | 0000 | 0022     | 12061000   | 2000003695 | 035310     | 0409650000 | 0000000    | 24      |    |
| 0270 | 1   | 151 | 100 | 31    | 0.000     | 1.4     | 0.0          | 1.4    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 010  | 0000 | 1122     | 12041000   | 2000003695 | 039330     | 0409650000 | 0000000    | 24      |    |
| 0271 | 1   | 252 | 111 | 31    | 0.000     | 1.5     | 2.4          | 2.0    | 1     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 032  | 1121 | 0022     | 23052002   | 2000003946 | 019915     | 0000000000 | 0000000    | 24      |    |
| 0272 | 3   | 151 | 111 | 31    | 0.000     | 0.2     | 0.8          | 0.7    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 1    | 032  | 0000 | 0022     | 13032000   | 2000003946 | 020710     | 0000000000 | 0000000    | 24      |    |
| 0273 | 3   | 242 | 100 | 32    | 3.000     | 0.8     | 0.0          | 1.6    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 031  | 0000 | 0022     | 11092000   | 2000003946 | 031627     | 2811650000 | 0000000    | 24      |    |
| 0274 | 3   | 242 | 100 | 32    | 2.000     | 1.0     | 0.0          | 1.2    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 031  | 0000 | 0022     | 11092000   | 2000003946 | 032200     | 2811650000 | 0000000    | 24      |    |
| 0275 | 3   | 252 | 100 | 31    | 0.000     | 0.9     | 0.0          | 0.6    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 031  | 0000 | 0022     | 12062000   | 2000003946 | 032610     | 2811650000 | 0000000    | 24      |    |
| 0276 | 3   | 252 | 100 | 31    | 0.000     | 1.9     | 0.0          | 1.9    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 033  | 1111 | 1221     | 21032004   | 2000003969 | 022610     | 1207670000 | 0000000    | 24      |    |
| 0277 | 3   | 252 | 111 | 31    | 0.000     | 3.9     | 1.7          | 2.8    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 1    | 033  | 1111 | 1221     | 23032001   | 2000003969 | 022610     | 1207670000 | 0000000    | 24      |    |
| 0278 | 1   | 751 | 211 | 31    | 0.000     | 0.2     | 0.3          | 0.3    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 1    | 110  | 1112 | 1322     | 12032006   | 2000003969 | 025110     | 1207670000 | 0000000    | 24      |    |
| 0279 | 1   | 751 | 200 | 31    | 0.000     | 1.5     | 0.0          | 1.5    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 110  | 1112 | 1322     | 12032006   | 2000003969 | 025110     | 1207670000 | 0000000    | 24      |    |
| 0280 | 1   | 751 | 200 | 31    | 0.000     | 0.6     | 0.0          | 0.6    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 1    | 110  | 1112 | 1322     | 12032006   | 2000003969 | 025430     | 1207670000 | 0000000    | 24      |    |
| 0281 | 1   | 751 | 211 | 31    | 0.000     | 1.5     | 0.7          | 0.9    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 1    | 110  | 1112 | 1322     | 12032004   | 2000003969 | 025430     | 1207670000 | 0000000    | 24      |    |
| 0282 | 3   | 343 | 111 | 62    | 4.000     | 0.0     | 2.1          | 1.4    | 1     | 0    | 0.0   | 0.3  | 0    | 0     | 0    | 0    | 031  | 1121 | 0021     | 11071002   | 2000004161 | 029636     | 2001670000 | 0000000    | 24      |    |
| 0283 | 3   | 343 | 111 | 62    | 5.200     | 0.6     | 1.0          | 0.9    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 0    | 031  | 1121 | 0021     | 12091002   | 2000004161 | 029636     | 2001670000 | 0000000    | 24      |    |
| 0284 | 3   | 353 | 111 | 31    | 0.000     | 1.1     | 1.2          | 1.2    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 0    | 032  | 0000 | 1322     | 11041000   | 2000004161 | 030026     | 2001670000 | 0000000    | 24      |    |
| 0285 | 3   | 353 | 111 | 31    | 0.000     | 0.5     | 1.8          | 1.6    | 1     | 0    | 0.0   | 0.7  | 0    | 0     | 0    | 3    | 032  | 0000 | 1322     | 11031000   | 2000004161 | 030333     | 2001670000 | 0000000    | 24      |    |
| 0286 | 3   | 252 | 100 | 31    | 0.000     | 0.3     | 0.0          | 0.3    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 4    | 010  | 0000 | 1222     | 12051000   | 2000004162 | 024217     | 2601670000 | 0000000    | 24      |    |
| 0287 | 3   | 252 | 100 | 31    | 0.000     | 0.0     | 0.0          | 0.0    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 4    | 010  | 0000 | 1222     | 13061000   | 2000004162 | 024415     | 2601670000 | 0000000    | 24      |    |
| 0288 | 3   | 252 | 111 | 31    | 0.000     | 0.3     | 2.4          | 1.4    | 1     | 0    | 0.0   | 0.2  | 0    | 0     | 0    | 0    | 010  | 1112 | 0022     | 11091001   | 2000004162 | 028213     | 2601670000 | 0000000    | 24      |    |
| 0289 | 3   | 252 | 100 | 31    | 0.000     | 1.2     | 0.0          | 1.2    | 0     | 0    | 0.0   | 0.1  | 0    | 0     | 0    | 0    | 010  | 1112 | 0022     | 11091002   | 2000004162 | 028213     | 2601670000 | 0000000    | 24      |    |
| 0290 | 3   | 252 | 111 | 31    | 0.000     | 0.0     | 2.4          | 1.8    | 1     | 0    | 0.0   | 0.4  | 0    | 0     | 0    | 0    | 010  | 1112 | 0022     | 11091003   | 200000400  |            |            |            |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | Y   | RO/16 | FIRE TIME | R    | O   | TIM  | TRG | 2ND | POSN | R    | M | OTH | MSUM | O | A   | NO   | REEL | FRAME    | DATE       | BN         | B           | DIV         | AO        |           |
|------|-----|-----|-----|-------|-----------|------|-----|------|-----|-----|------|------|---|-----|------|---|-----|------|------|----------|------------|------------|-------------|-------------|-----------|-----------|
|      |     | FSP | M   | A     | T         | 1ST  | SUB | ALL  | HR  | POS | PUL  | FS   | M | A   | D    | E | C   | F    | VZBN | AN       | S          | R          | REG         | B           | MC        |           |
| 0295 | 3   | 252 | 111 | 32    | 3.700     | 2.3  | 2.3 | 2.3  | 1   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 010 | 0.00 | 0022 | 12042000 | 2000004162 | 030320     | 26016700000 | 0000000     | 000000 24 |           |
| 0296 | 1   | 242 | 111 | 62    | 4.200     | 0.3  | 2.2 | 1.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 021 | 1121 | 0022 | 11092002 | 2000004257 | 032812     | 12126600000 | 0000000     | 000000 24 |           |
| 0297 | 1   | 242 | 111 | 62    | 3.000     | 0.0  | 2.8 | 1.9  | 1   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 021 | 1121 | 1022 | 13062002 | 2000004257 | 033400     | 12126600000 | 0000000     | 000000 24 |           |
| 0298 | 1   | 252 | 111 | 62    | 4.300     | 0.5  | 2.0 | 1.5  | 1   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 021 | 1121 | 1022 | 12031001 | 2000004257 | 033812     | 12126600000 | 0000000     | 000000 24 |           |
| 0299 | 3   | 252 | 111 | 41    | 0.002     | 0.2  | 2.4 | 1.9  | 1   | 0   | 0.0  | 0.4  | 0 | 0   | 0    | 0 | 032 | 0000 | 0022 | 22042000 | 2000004275 | 025310     | 08026700000 | 0000000     | 000000 24 |           |
| 0300 | 1   | 151 | 100 | 31    | 0.000     | 1.9  | 0.0 | 1.9  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 010  | 1112 | 1322     | 11061003   | 2000004286 | 004822      | 14016700015 | 0010000   | 000000 24 |
| 0301 | 1   | 751 | 200 | 31    | 0.000     | 1.0  | 0.0 | 1.0  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 010  | 1112 | 1322     | 11031001   | 2000004286 | 004822      | 14016700015 | 0010000   | 000000 24 |
| 0302 | 1   | 252 | 100 | 31    | 0.000     | 0.9  | 0.0 | 0.9  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 3   | 022  | 0007 | 1322     | 11061003   | 2000004286 | 005429      | 14016700015 | 0010000   | 000000 24 |
| 0303 | 1   | 353 | 100 | 31    | 0.000     | 1.4  | 0.0 | 1.4  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 032  | 0000 | 1322     | 23061000   | 2000004286 | 013732      | 14016700015 | 0010000   | 000000 24 |
| 0304 | 1   | 252 | 100 | 31    | 0.000     | 0.5  | 0.0 | 0.5  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 032  | 1121 | 0022     | 12031002   | 2000004286 | 014400      | 14016700015 | 0010000   | 000000 24 |
| 0305 | 1   | 151 | 111 | 31    | 0.000     | 1.6  | 3.2 | 2.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 1   | 010  | 1111 | 0022     | 11051001   | 2000004286 | 020134      | 14016700015 | 0010000   | 000000 24 |
| 0306 | 1   | 252 | 100 | 31    | 0.000     | 1.2  | 0.0 | 1.2  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 010  | 1112 | 1322     | 11051001   | 2000004286 | 021104      | 14016700015 | 0010000   | 000000 24 |
| 0307 | 1   | 454 | 111 | 31    | 0.002     | 3.1  | 1.1 | 2.1  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 1   | 010  | 1112 | 1322     | 11041002   | 2000004286 | 021104      | 14016700015 | 0010000   | 000000 24 |
| 0308 | 1   | 454 | 111 | 31    | 0.000     | 2.4  | 2.2 | 2.4  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 0   | 010  | 1111 | 0022     | 11041002   | 2000004286 | 021439      | 14016700015 | 0010000   | 000000 24 |
| 0309 | 1   | 454 | 100 | 31    | 0.000     | 1.3  | 0.0 | 1.3  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 021  | 1111 | 0022     | 11051003   | 2000004286 | 021439      | 14016700015 | 0010000   | 000000 24 |
| 0310 | 1   | 353 | 111 | 31    | 0.000     | 1.2  | 4.3 | 2.8  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 0   | 021  | 1111 | 0022     | 12021000   | 2000004286 | 021903      | 14016700015 | 0010000   | 000000 24 |
| 0311 | 3   | 353 | 111 | 31    | 0.000     | 1.4  | 0.0 | 1.4  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 11071001   | 2000004301 | 030632      | 05016700025 | 0030000   | 000000 24 |
| 0312 | 3   | 353 | 100 | 31    | 0.000     | 3.6  | 2.4 | 3.0  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 11071002   | 2000004301 | 030632      | 05016700025 | 0030000   | 000000 24 |
| 0313 | 3   | 252 | 111 | 31    | 0.000     | 5.8  | 2.1 | 3.4  | 1   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 13051000   | 2000004301 | 031133      | 05016700025 | 0030000   | 000000 24 |
| 0314 | 3   | 353 | 111 | 31    | 0.000     | 2.1  | 5.1 | 3.6  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 13071002   | 2000004301 | 031725      | 05016700025 | 0030000   | 000000 24 |
| 0315 | 3   | 353 | 111 | 31    | 0.000     | 2.7  | 4.5 | 3.6  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 11041001   | 2000004301 | 032334      | 05016700025 | 0030000   | 000000 24 |
| 0316 | 3   | 353 | 111 | 31    | 0.000     | 2.7  | 4.5 | 3.6  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 1   | 031  | 1111 | 1322     | 12031000   | 2000004301 | 033010      | 05016700025 | 0030000   | 000000 24 |
| 0317 | 3   | 353 | 100 | 31    | 0.000     | 7.4  | 0.0 | 7.4  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 031  | 0000 | 1322     | 12051000   | 2000004301 | 034702      | 05016700025 | 0030000   | 000000 24 |
| 0318 | 3   | 156 | 200 | 3218  | 0.000     | 0.1  | 0.0 | 2.3  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 1   | 022  | 0000 | 1322     | 12021000   | 2000004322 | 001622      | 17106500000 | 0000000   | 000000 24 |
| 0319 | 3   | 444 | 111 | 62    | 5.000     | 2.4  | 2.5 | 2.5  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 11032002   | 2000004327 | 022422      | 05106600000 | 0000000   | 000000 24 |
| 0320 | 3   | 343 | 142 | 62    | 3.200     | 0.7  | 2.2 | 1.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0022     | 13041002   | 2000004327 | 023317      | 05106700000 | 0000000   | 000000 24 |
| 0321 | 3   | 343 | 142 | 62    | 3.200     | 0.0  | 4.1 | 3.3  | 2   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 0000 | 0021     | 13051000   | 2000004327 | 023932      | 05106700000 | 0000000   | 000000 24 |
| 0322 | 3   | 343 | 111 | 62    | 4.000     | 0.7  | 3.0 | 2.6  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 12051002   | 2000004327 | 025012      | 05106700000 | 0000000   | 000000 24 |
| 0323 | 3   | 444 | 111 | 62    | 4.400     | 0.0  | 2.3 | 1.8  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 12031001   | 2000004327 | 027423      | 05106700000 | 0000000   | 000000 24 |
| 0324 | 3   | 444 | 100 | 62    | 3.000     | 1.4  | 0.0 | 2.1  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 0000 | 0021     | 12041000   | 2000004339 | 032500      | 17036700000 | 0000000   | 000000 24 |
| 0325 | 3   | 444 | 100 | 62    | 3.000     | 5.1  | 0.0 | 6.1  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1122 | 0021     | 12091001   | 2000004339 | 032710      | 17036700000 | 0000000   | 000000 24 |
| 0326 | 3   | 454 | 100 | 62    | 4.000     | 11.7 | 0.0 | 12.4 | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 12091001   | 2000004339 | 033338      | 17036700000 | 0000000   | 000000 24 |
| 0327 | 1   | 242 | 100 | 62    | 3.000     | 0.0  | 0.0 | 0.9  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 11042002   | 2000004740 | 013036      | 06106700000 | 0000000   | 000000 24 |
| 0328 | 1   | 242 | 111 | 6218  | 5.000     | 0.4  | 5.9 | 3.1  | 1   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0022     | 11032001   | 2000004740 | 013312      | 06106700000 | 0000000   | 000000 24 |
| 0329 | 1   | 252 | 100 | 41    | 0.002     | 0.6  | 0.0 | 0.6  | 0   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 4   | 010  | 1121 | 1322     | 11061003   | 2000004791 | 014035      | 06106700000 | 0000000   | 000000 24 |
| 0330 | 1   | 252 | 100 | 41    | 0.002     | 0.3  | 0.5 | 0.5  | 1   | 0   | 0.0  | 0.0  | 0 | 0   | 0    | 0 | 4   | 010  | 1121 | 1322     | 11061003   | 2000004791 | 024102      | 09086700025 | 0090000   | 000000 24 |
| 0331 | 1   | 252 | 111 | 41    | 0.002     | 0.1  | 2.2 | 1.1  | 1   | 0   | 0.0  | 0.0  | 0 | 0   | 0    | 0 | 0   | 010  | 1112 | 1322     | 11071002   | 2000004791 | 024207      | 09086700025 | 0090000   | 000000 24 |
| 0332 | 1   | 252 | 100 | 41    | 0.002     | 4.0  | 0.0 | 4.0  | 0   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 0   | 010  | 1111 | 1322     | 11071003   | 2000004791 | 024937      | 09086700025 | 0090000   | 000000 24 |
| 0333 | 1   | 252 | 100 | 41    | 0.002     | 4.0  | 0.0 | 4.0  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 010  | 1111 | 1322     | 11071002   | 2000004791 | 024937      | 09086700025 | 0090000   | 000000 24 |
| 0334 | 3   | 353 | 100 | 31    | 0.000     | 4.2  | 0.0 | 4.2  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 11041001   | 2000005104 | 000412      | 23026800000 | 0000000   | 000000 24 |
| 0335 | 3   | 252 | 100 | 31    | 0.000     | 3.5  | 0.0 | 3.5  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 021  | 1121 | 0021     | 12032106   | 2000005104 | 000720      | 23026800000 | 0000000   | 000000 24 |
| 0336 | 3   | 343 | 100 | 62    | 4.000     | 5.2  | 0.0 | 6.2  | 0   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1111 | 0022     | 13032106   | 2000005156 | 000232      | 17036800000 | 0000000   | 000000 24 |
| 0337 | 3   | 343 | 111 | 6216  | 0.000     | 0.1  | 5.1 | 2.6  | 3   | 0   | 0.0  | 0.2  | 0 | 0   | 0    | 0 | 0   | 031  | 0000 | 0022     | 13032106   | 2000005156 | 000828      | 17036800000 | 0000000   | 000000 24 |
| 0338 | 3   | 343 | 111 | 62    | 8.700     | 0.7  | 2.2 | 1.7  | 3   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0022     | 12031002   | 2000005156 | 002402      | 17036800000 | 0000000   | 000000 24 |
| 0339 | 3   | 343 | 111 | 62    | 4.000     | 0.4  | 1.0 | 0.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0022     | 13041001   | 2000005156 | 003838      | 17036800000 | 0000000   | 000000 24 |
| 0340 | 3   | 343 | 111 | 62    | 4.800     | 0.0  | 1.0 | 0.9  | 1   | 0   | 0.0  | 0.1  | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0022     | 13041001   | 2000005156 | 004124      | 17036800000 | 0000000   | 000000 24 |
| 0341 | 3   | 353 | 111 | 41    | 0.002     | 0.5  | 0.6 | 0.6  | 1   | 0   | 0.0  | 0.12 | 0 | 0   | 0    | 0 | 0   | 031  | 1121 | 0021     | 13041001   | 2000005156 | 004124      | 17036800000 | 0000000   | 000000 24 |
| 0342 | 3   | 252 | 131 | 41    | 0.002     | 1.1  | 1.7 | 1.5  | 1   | 0   | 0.0  | 0.3  | 0 | 0   | 0    | 0 | 0   | 021  | 1111 | 0021     | 13101008   | 2000005030 | 014031      | 02126700000 | 0000000   | 000000 24 |
| 0343 | 3   | 353 | 111 | 41    | 0.002     | 0.8  | 0.4 | 0.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   | 031  | 1111 | 0021     | 12111007   | 2000005030 | 014031      | 02126700000 | 0000000   | 000000 24 |
| 0344 | 3   | 353 | 111 | 41    | 0.002     | 0.8  | 0.4 | 0.9  | 1   | 0   | 0.0  | 0.5  | 0 | 0   | 0    | 0 | 0   |      |      |          |            |            |             |             |           |           |

## SMALL ARMS EFFECT DATA

| LSN  | 0 | POS | AIM | W    | RD/16 | FIRE TIME   | R D T I M | TRG 2ND POSN | R M | OTHER MSUM | Q    | A NO | REEL     | FRAME      | DATE   | BN          | R       | REG | AO | MC |
|------|---|-----|-----|------|-------|-------------|-----------|--------------|-----|------------|------|------|----------|------------|--------|-------------|---------|-----|----|----|
|      |   | FSP | M   | A    | T     | 1ST SUB ALL | H R POS   | PUL FS M A D | E   | C          | F    | VZUN | AN S     |            |        |             |         |     |    |    |
| 0344 | 1 | 252 | 111 | 41   | 0.002 | 0.5 1.0 0.9 | 1 0       | 0.0 09       | 0   | 021        | 0000 | 0022 | 11021000 | 2000004755 | 007610 | 07106700015 | 0090000 | 24  |    |    |
| 0345 | 3 | 751 | 211 | 41   | 2.502 | 2.3 1.0 1.2 | 1 0       | 0.0 08       | 0   | 110        | 1112 | 0022 | 11112002 | 2000004775 | 020004 | 07106700015 | 0090000 | 24  |    |    |
| 0346 | 3 | 751 | 211 | 41   | 0.002 | 0.7 1.0 1.9 | 1 0       | 0.0 08       | 0   | 010        | 1112 | 0022 | 11102001 | 2000004775 | 019915 | 07106700015 | 0090000 | 24  |    |    |
| 0347 | 1 | 252 | 111 | 41   | 0.002 | 0.6 0.8 0.8 | 1 0       | 0.0 14       | 0   | 031        | 1111 | 0021 | 11031002 | 2000005731 | 036916 | 20096800025 | 0070015 | 24  |    |    |
| 0348 | 1 | 252 | 111 | 41   | 0.002 | 1.9 1.0 1.0 | 1 0       | 0.0 11       | 0   | 031        | 1111 | 0021 | 11031001 | 2000005731 | 036916 | 20096800025 | 0070015 | 24  |    |    |
| 0349 | 1 | 252 | 111 | 41   | 0.002 | 0.2 0.2 0.2 | 1 0       | 0.0 11       | 0   | 010        | 0000 | 0022 | 11041000 | 2000005731 | 036107 | 20096800025 | 0070015 | 24  |    |    |
| 0350 | 1 | 252 | 111 | 41   | 0.002 | 0.4 0.4 0.4 | 1 0       | 0.0 05       | 0   | 022        | 1111 | 0022 | 12032002 | 2000005734 | 003417 | 30116800035 | 0050015 | 24  |    |    |
| 0351 | 1 | 252 | 111 | 41   | 0.002 | 1.6 3.0 2.3 | 1 0       | 0.0 02       | 0   | 022        | 1111 | 0022 | 12032001 | 2000005734 | 003417 | 30116800035 | 0050015 | 24  |    |    |
| 0352 | 1 | 252 | 111 | 41   | 0.002 | 1.3 0.3 0.4 | 1 0       | 6.4 11       | 0   | 022        | 1111 | 1.72 | 11062002 | 2000005734 | 004218 | 30116800035 | 0050015 | 24  |    |    |
| 0353 | 1 | 252 | 111 | 41   | 0.002 | 7.7 1.9 4.8 | 1 0       | 0.0 02       | 0   | 022        | 1111 | 1.72 | 11062001 | 2000005734 | 003425 | 30116800035 | 0050015 | 24  |    |    |
| 0354 | 1 | 252 | 111 | 41   | 0.002 | 0.5 0.4 0.4 | 1 0       | 0.0 13       | 0   | 022        | 0000 | 1.72 | 13042000 | 2000005734 | 004623 | 30116800035 | 0050015 | 24  |    |    |
| 0355 | 3 | 252 | 111 | 41   | 0.002 | 0.3 1.4 1.3 | 1 0       | 0.0 09       | 0   | 032        | 1111 | 0022 | 13022002 | 2000005734 | 022427 | 01126800035 | 0050015 | 24  |    |    |
| 0356 | 3 | 252 | 111 | 41   | 0.002 | 1.4 2.2 2.1 | 1 0       | 0.0 05       | 0   | 032        | 1111 | 0022 | 13022001 | 2000005734 | 022827 | 01126800035 | 0050015 | 24  |    |    |
| 0357 | 3 | 252 | 111 | 41   | 0.002 | 0.6 0.6 0.6 | 1 0       | 0.8 07       | 0   | 030        | 1121 | 0022 | 12032002 | 2000005734 | 024123 | 01126800035 | 0050015 | 24  |    |    |
| 0358 | 3 | 151 | 111 | 41   | 0.002 | 0.4 0.2 0.2 | 1 0       | 0.0 05       | 0   | 010        | 1121 | 0022 | 11032001 | 2000005734 | 024630 | 01126800035 | 0050015 | 24  |    |    |
| 0359 | 1 | 141 | 100 | 6240 | 0.000 | 0.0 0.0 5.9 | 0 0       | 0.0 01       | 0   | 031        | 0000 | 0022 | 12062000 | 2000005734 | 033628 | 01126800035 | 0050015 | 24  |    |    |
| 0360 | 3 | 454 | 100 | 41   | 0.002 | 0.3 0.0 0.3 | 0 0       | 5.7 01       | 0   | 031        | 1121 | 0022 | 11052001 | 2000005734 | 034328 | 01126800035 | 0050015 | 24  |    |    |
| 0361 | 1 | 454 | 100 | 41   | 0.002 | 1.5 0.7 1.1 | 1 0       | 0.0 02       | 0   | 031        | 1121 | 0022 | 11032001 | 2000005734 | 034712 | 01126800035 | 0050015 | 24  |    |    |
| 0362 | 3 | 252 | 111 | 41   | 0.002 | 0.0 0.7 0.5 | 2 0       | 0.0 03       | 0   | 032        | 0000 | 0022 | 23041000 | 2000005766 | 000417 | 16016900015 | 0050015 | 24  |    |    |
| 0363 | 3 | 151 | 111 | 41   | 0.002 | 0.4 0.4 0.4 | 1 0       | 2.5 03       | 0   | 032        | 1121 | 0022 | 23092001 | 2000005766 | 000436 | 16016900015 | 0050015 | 24  |    |    |
| 0364 | 3 | 252 | 111 | 41   | 0.002 | 0.0 0.5 0.4 | 1 0       | 0.0 06       | 0   | 032        | 0000 | 0022 | 12021000 | 2000005766 | 001129 | 16016900015 | 0050015 | 24  |    |    |
| 0365 | 3 | 252 | 111 | 41   | 0.002 | 0.1 0.4 0.2 | 1 0       | 0.0 02       | 0   | 032        | 1121 | 0022 | 12031000 | 2000005766 | 001702 | 16016900015 | 0050015 | 24  |    |    |
| 0366 | 3 | 151 | 111 | 41   | 0.002 | 0.0 0.5 0.4 | 1 0       | 0.0 06       | 0   | 032        | 1121 | 0022 | 12041001 | 2000005766 | 025490 | 16016900015 | 0050015 | 24  |    |    |
| 0367 | 3 | 151 | 111 | 41   | 0.002 | 0.2 0.5 0.4 | 1 0       | 0.0 04       | 0   | 042        | 0000 | 0022 | 12042000 | 2000005766 | 025490 | 16016900015 | 0050015 | 24  |    |    |
| 0368 | 3 | 151 | 111 | 41   | 0.002 | 1.1 1.0 1.0 | 1 0       | 0.0 06       | 0   | 010        | 1112 | 0022 | 11091003 | 2000005767 | 000002 | 16016900000 | 0000015 | 24  |    |    |
| 0369 | 3 | 151 | 111 | 41   | 0.002 | 0.5 1.6 1.3 | 1 0       | 2.8 04       | 0   | 010        | 1112 | 0022 | 11092002 | 2000005767 | 000130 | 16016900000 | 0000015 | 24  |    |    |
| 0370 | 3 | 752 | 211 | 62   | 6.000 | 0.0 2.6 1.7 | 1 0       | 0.0 03       | 0   | 033        | 0000 | 0022 | 23031000 | 2000005782 | 000925 | 29126800035 | 0030035 | 24  |    |    |
| 0371 | 3 | 252 | 111 | 41   | 0.002 | 0.8 1.0 1.0 | 1 0       | 0.0 04       | 0   | 033        | 1111 | 0022 | 22041002 | 2000005782 | 001230 | 29126800035 | 0030035 | 24  |    |    |
| 0372 | 3 | 252 | 111 | 41   | 0.002 | 1.2 0.5 0.6 | 1 0       | 0.0 12       | 0   | 033        | 0000 | 0022 | 23061000 | 2000005782 | 001703 | 29126800035 | 0030035 | 24  |    |    |
| 0373 | 3 | 151 | 111 | 41   | 0.002 | 0.3 3.0 2.1 | 1 0       | 0.0 03       | 0   | 032        | 1111 | 0022 | 21032002 | 2000005797 | 008223 | 28106800035 | 0050015 | 24  |    |    |
| 0374 | 3 | 151 | 111 | 41   | 0.002 | 3.4 4.9 4.1 | 1 0       | 0.0 02       | 0   | 032        | 1121 | 0022 | 22072002 | 2000005797 | 008702 | 28106800035 | 0050015 | 24  |    |    |
| 0375 | 3 | 343 | 111 | 62   | 2.000 | 1.7 5.3 3.5 | 1 0       | 0.0 02       | 0   | 031        | 1121 | 0022 | 22022002 | 2000005797 | 009210 | 28106800035 | 0050015 | 24  |    |    |
| 0376 | 3 | 353 | 111 | 62   | 2.000 | 2.9 8.6 5.7 | 1 0       | 0.0 02       | 0   | 031        | 1121 | 1322 | 12062002 | 2000005797 | 009921 | 28106800035 | 0050015 | 24  |    |    |
| 0377 | 3 | 343 | 111 | 62   | 3.000 | 1.0 1.5 1.2 | 1 0       | 0.0 02       | 0   | 031        | 1121 | 0022 | 12042002 | 2000005797 | 014835 | 28106800035 | 0050015 | 24  |    |    |
| 0378 | 3 | 353 | 111 | 62   | 2.000 | 1.4 1.2 1.3 | 1 0       | 1.2 02       | 0   | 031        | 1121 | 0022 | 12042002 | 2000005797 | 015132 | 28106800035 | 0050015 | 24  |    |    |
| 0379 | 3 | 343 | 111 | 62   | 3.700 | 0.0 0.9 0.4 | 1 0       | 0.0 12       | 0   | 032        | 0000 | 1322 | 13052000 | 2000005797 | 015315 | 28106800035 | 0050015 | 24  |    |    |
| 0380 |   |     |     |      |       |             |           |              |     |            |      |      |          |            |        |             |         |     |    |    |
| 0381 |   |     |     |      |       |             |           |              |     |            |      |      |          |            |        |             |         |     |    |    |
| 0382 |   |     |     |      |       |             |           |              |     |            |      |      |          |            |        |             |         |     |    |    |
| 0383 | 3 | 252 | 111 | 41   | 0.002 | 0.2 0.4 0.9 | 3 0       | 0.0 09       | 0   | 032        | 1111 | 0022 | 11092001 | 2000005983 | 016016 | 21046900015 | 0050015 | 24  |    |    |
| 0384 | 3 | 752 | 242 | 62   | 7.300 | 0.0 2.0 1.4 | 3 0       | 0.0 03       | 0   | 010        | 0000 | 0022 | 21042000 | 2000005983 | 016617 | 21046900015 | 0050015 | 24  |    |    |
| 0385 | 3 | 252 | 111 | 62   | 2.500 | 0.0 1.4 1.2 | 1 0       | 0.0 10       | 0   | 021        | 1121 | 0022 | 11072002 | 2000005983 | 016836 | 21046900015 | 0050015 | 24  |    |    |
| 0386 | 3 | 252 | 100 | 6237 | 0.000 | 0.2 0.0 7.9 | 0 0       | 0.0 01       | 0   | 010        | 1122 | 0022 | 11042002 | 2000005983 | 017610 | 21046900015 | 0050015 | 24  |    |    |
| 0387 | 3 | 252 | 111 | 41   | 0.001 | 0.9 0.7 0.7 | 1 0       | 0.0 13       | 0   | 021        | 0000 | 132  | 11041000 | 2000005983 | 016113 | 21046900015 | 0050015 | 24  |    |    |
| 0388 | 3 | 414 | 100 | 31   | 0.000 | 6.8 0.0 6.8 | 0 0       | 0.0 01       | 0   | 021        | 0000 | 1321 | 11041000 | 2000005983 | 018714 | 21046900015 | 0050015 | 24  |    |    |
| 0389 | 3 | 151 | 111 | 41   | 0.002 | 0.3 0.6 0.6 | 1 0       | 0.6 12       | 0   | 032        | 1111 | 0022 | 11092002 | 2000005983 | 020025 | 21046900015 | 0050015 | 24  |    |    |
| 0390 | 3 | 252 | 100 | 41   | 0.002 | 1.6 0.0 1.6 | 0 0       | 0.0 01       | 0   | 032        | 1121 | 0022 | 11092002 | 2000005983 | 020637 | 21046900015 | 0050015 | 24  |    |    |
| 0391 | 1 | 751 | 211 | 41   | 0.002 | 0.1 0.5 0.4 | 1 0       | 0.0 05       | 0   | 010        | 0000 | 1322 | 11051000 | 2000005983 | 021100 | 21046900015 | 0050015 | 24  |    |    |
| 0392 | 1 | 751 | 211 | 31   | 0.000 | 1.1 2.3 1.7 | 1 0       | 0.0 02       | 0   | 010        | 0000 | 1322 | 11051000 | 2000005983 | 021319 | 21046900015 | 0050015 | 24  |    |    |

[illegible]

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE TIME | R D TIM | TGK 2ND | POSN | R M | OTHER | MSUM | O   | A NO | REEL | FRAME | DATE | BN B | OIV | L    |      |          |            |             |            |            |         |    |
|------|-----|-----|-------|-----------|---------|---------|------|-----|-------|------|-----|------|------|-------|------|------|-----|------|------|----------|------------|-------------|------------|------------|---------|----|
|      |     | FSP | M     | A         | T       | IST     | SUB  | ALL | H M   | POS  | PUL | FS   | M    | A     | D    | E    | C   | F    | VZBN | AN S     | V R        | R           | REG        | B          | MC      |    |
| 0491 | 1   | 232 | 111   | 51        | 0.000   | 4.6     | 1.7  | 2.4 | 1     | 0    | 0.0 | 04   | 00   | 0     | 0    | 0    | 031 | 0000 | 0022 | 13092000 | 2000000197 | 012636      | 0910440000 | 0070000    | 22      |    |
| 0492 | 1   | 232 | 111   | 52        | 3.500   | 0.9     | 4.8  | 2.9 | 1     | 0    | 0.0 | 02   | 00   | 0     | 0    | 0    | 031 | 0000 | 0022 | 13112000 | 2000000197 | 013405      | 0910440000 | 0070000    | 22      |    |
| 0493 | 1   | 353 | 111   | 21        | 0.000   | 1.0     | 1.7  | 1.5 | 1     | 0    | 0.0 | 03   | 00   | 0     | 0    | 0    | 2   | 031  | 0000 | 1222     | 13052000   | 2000000197  | 014215     | 0910440000 | 0070000 | 22 |
| 0494 | 1   | 353 | 111   | 52        | 3.200   | 1.0     | 2.6  | 2.0 | 1     | 0    | 0.0 | 03   | 00   | 0     | 0    | 0    | 2   | 031  | 0000 | 1222     | 13052000   | 2000000197  | 014610     | 0910440000 | 0070000 | 22 |
| 0495 | 1   | 252 | 111   | 11        | 0.000   | 1.0     | 1.5  | 1.5 | 1     | 0    | 0.0 | 08   | 00   | 0     | 0    | 0    | 0   | 031  | 1121 | 0022     | 13032001   | 2000000197  | 015007     | 0910440000 | 0070000 | 22 |
| 0496 | 1   | 111 | 111   | 52        | 2.300   | 0.6     | 4.0  | 3.1 | 1     | 0    | 0.0 | 04   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 11052000   | 2000000197  | 023501     | 0910440000 | 0070000 | 22 |
| 0497 | 1   | 151 | 100   | 11        | 0.000   | 2.8     | 0.0  | 2.8 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 1   | 010  | 1121 | 1122     | 11062001   | 2000000195  | 011318     | 0000000000 | 0000000 | 22 |
| 0498 | 1   | 751 | 200   | 21        | 0.000   | 0.1     | 0.0  | 0.1 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 1   | 010  | 0000 | 1122     | 11062000   | 2000000195  | 011704     | 0000000000 | 0000000 | 22 |
| 0499 | 1   | 333 | 100   | 21        | 0.000   | 7.5     | 0.0  | 7.5 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1111 | 0021     | 11042003   | 2000000195  | 033000     | 0000000000 | 0000000 | 22 |
| 0500 | 1   | 252 | 100   | 11        | 0.000   | 9.0     | 0.0  | 9.0 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 021  | 1111 | 0021     | 11042004   | 2000000195  | 033000     | 0000000000 | 0000000 | 22 |
| 0501 | 1   | 333 | 100   | 11        | 0.000   | 3.3     | 0.0  | 3.3 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0021     | 11042000   | 2000000195  | 033608     | 0000000000 | 0000000 | 22 |
| 0502 |     |     |       |           |         |         |      |     |       |      |     |      |      |       |      |      |     |      |      |          |            |             |            |            |         |    |
| 0503 |     |     |       |           |         |         |      |     |       |      |     |      |      |       |      |      |     |      |      |          |            |             |            |            |         |    |
| 0504 | 1   | 353 | 111   | 11        | 0.000   | 0.7     | 2.3  | 1.9 | 1     | 0    | 0.0 | 04   | 00   | 0     | 0    | 0    | 0   | 031  | 1121 | 0022     | 11092001   | 20000002435 | 001130     | 0605450000 | 0000000 | 22 |
| 0505 | 1   | 151 | 100   | 11        | 0.000   | 0.0     | 0.0  | 0.0 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1112 | 0022     | 11062002   | 20000002435 | 003302     | 0005450000 | 0000000 | 22 |
| 0506 | 1   | 151 | 100   | 11        | 0.000   | 0.3     | 0.0  | 0.3 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1112 | 0022     | 11062003   | 20000002435 | 003302     | 0005450000 | 0000000 | 22 |
| 0507 | 1   | 151 | 100   | 11        | 0.000   | 1.1     | 0.0  | 1.1 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1112 | 0022     | 11062001   | 20000002435 | 003302     | 0005450000 | 0000000 | 22 |
| 0508 | 1   | 151 | 111   | 11        | 0.000   | 1.7     | 1.2  | 1.3 | 1     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1112 | 0022     | 11062002   | 20000002435 | 004033     | 0005450000 | 0000000 | 22 |
| 0509 | 1   | 151 | 111   | 11        | 0.000   | 0.5     | 1.2  | 1.0 | 1     | 0    | 0.0 | 04   | 00   | 0     | 0    | 0    | 0   | 110  | 1112 | 0022     | 11062002   | 20000002435 | 004033     | 0005450000 | 0000000 | 22 |
| 0510 | 1   | 751 | 200   | 11        | 0.000   | 0.1     | 0.0  | 0.1 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 1   | 010  | 1121 | 1122     | 11092002   | 20000002435 | 010035     | 0005450000 | 0000000 | 22 |
| 0511 | 1   | 252 | 100   | 11        | 0.000   | 0.2     | 0.0  | 0.2 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1121 | 0022     | 11092002   | 20000002435 | 010035     | 0005450000 | 0000000 | 22 |
| 0512 | 1   | 252 | 111   | 11        | 0.000   | 1.7     | 2.2  | 2.0 | 1     | 0    | 0.0 | 02   | 00   | 0     | 0    | 0    | 0   | 010  | 1121 | 0022     | 11032002   | 20000002435 | 013712     | 0005450000 | 0000000 | 22 |
| 0513 | 1   | 154 | 100   | 11        | 0.000   | 0.8     | 0.0  | 0.8 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 13042000   | 20000002435 | 013908     | 0005450000 | 0000000 | 22 |
| 0514 | 1   | 454 | 100   | 11        | 0.000   | 3.7     | 0.0  | 3.7 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 11052000   | 2000000252  | 004033     | 0005450000 | 0000000 | 22 |
| 0515 | 1   | 353 | 100   | 11        | 0.000   | 6.7     | 0.0  | 6.7 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1121 | 0022     | 11062003   | 2000000252  | 004031     | 0005450000 | 0000000 | 22 |
| 0516 | 1   | 333 | 100   | 11        | 0.000   | 7.9     | 0.0  | 7.9 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 13042000   | 2000000252  | 004707     | 0005450000 | 0000000 | 22 |
| 0517 | 1   | 131 | 111   | 52        | 2.500   | 0.5     | 5.6  | 3.0 | 1     | 0    | 0.0 | 02   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0021     | 12042000   | 2000000252  | 007427     | 0005450000 | 0000000 | 22 |
| 0518 | 1   | 353 | 111   | 11        | 0.000   | 4.0     | 8.0  | 6.0 | 1     | 0    | 0.0 | 02   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 12052000   | 2000000252  | 007907     | 0005450000 | 0000000 | 22 |
| 0519 | 1   | 353 | 100   | 52        | 3.000   | 1.5     | 0.0  | 1.9 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 3   | 031  | 0000 | 1322     | 13062000   | 2000000252  | 008633     | 0005450000 | 0000000 | 22 |
| 0520 | 1   | 353 | 100   | 11        | 0.000   | 4.0     | 0.0  | 4.0 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1121 | 0022     | 11082001   | 20000001444 | 005705     | 0005450000 | 0000000 | 22 |
| 0521 | 1   | 151 | 111   | 11        | 0.000   | 0.6     | 1.2  | 1.1 | 1     | 0    | 0.0 | 04   | 00   | 0     | 0    | 0    | 0   | 021  | 0000 | 0021     | 12072000   | 20000001567 | 000310     | 0005450000 | 0000000 | 22 |
| 0522 | 1   | 353 | 111   | 21        | 0.000   | 1.5     | 1.3  | 1.4 | 1     | 0    | 2.7 | 02   | 00   | 0     | 0    | 0    | 0   | 031  | 1111 | 0022     | 12052002   | 20000001603 | 016925     | 0005450000 | 0070015 | 23 |
| 0523 | 1   | 212 | 100   | 11        | 0.000   | 5.7     | 0.0  | 5.7 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1121 | 0022     | 11092001   | 20000001604 | 004816     | 0005450000 | 0000000 | 23 |
| 0524 | 1   | 454 | 100   | 21        | 0.000   | 3.7     | 0.0  | 3.7 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 021  | 1121 | 0022     | 11072002   | 20000001604 | 005635     | 0005450000 | 0000000 | 23 |
| 0525 | 1   | 454 | 100   | 21        | 0.000   | 5.8     | 0.0  | 5.8 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 021  | 1121 | 0022     | 11072002   | 20000001604 | 005930     | 0005450000 | 0000000 | 23 |
| 0526 | 1   | 454 | 100   | 21        | 0.000   | 1.8     | 0.0  | 1.8 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 0000 | 0022     | 11072000   | 20000001604 | 006504     | 0005450000 | 0000000 | 23 |
| 0527 | 1   | 252 | 100   | 11        | 0.000   | 1.5     | 0.0  | 1.5 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 321  | 1121 | 0022     | 11042002   | 20000001604 | 006735     | 0005450000 | 0000000 | 23 |
| 0528 | 1   | 252 | 100   | 11        | 0.000   | 1.3     | 0.0  | 1.3 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 010  | 1122 | 0022     | 11072002   | 20000001638 | 034513     | 0005450000 | 0000000 | 23 |
| 0529 | 1   | 353 | 111   | 52        | 1.600   | 1.6     | 1.4  | 1.4 | 1     | 0    | 0.0 | 11   | 00   | 0     | 0    | 0    | 0   | 010  | 0000 | 0022     | 12032000   | 20000001638 | 036617     | 0005450000 | 0000000 | 23 |
| 0530 | 1   | 353 | 100   | 11        | 0.000   | 1.5     | 0.0  | 1.5 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0022     | 12052000   | 20000001639 | 019025     | 0005450000 | 0000000 | 23 |
| 0531 | 1   | 252 | 100   | 11        | 0.000   | 2.9     | 0.0  | 2.9 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1111 | 0021     | 13092003   | 20000001640 | 012028     | 0005450000 | 0000000 | 23 |
| 0532 | 1   | 252 | 111   | 11        | 0.000   | 4.1     | 2.7  | 3.4 | 1     | 0    | 0.0 | 02   | 00   | 0     | 0    | 0    | 0   | 021  | 1111 | 0021     | 13092004   | 20000001640 | 012028     | 0005450000 | 0000000 | 23 |
| 0533 | 1   | 232 | 100   | 11        | 0.000   | 1.0     | 0.0  | 1.0 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1111 | 0022     | 12092002   | 20000001640 | 012402     | 0005450000 | 0000000 | 23 |
| 0534 | 1   | 252 | 100   | 11        | 0.000   | 0.9     | 0.0  | 0.9 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 1111 | 0022     | 13061000   | 20000001727 | 001533     | 0005450000 | 0000000 | 23 |
| 0535 | 1   | 252 | 100   | 11        | 0.000   | 1.5     | 0.0  | 1.5 | 0     | 0    | 0.0 | 01   | 00   | 0     | 0    | 0    | 0   | 031  | 0000 | 0021     | 13032000   | 20000001727 | 002703     | 0005450000 | 0000000 | 23 |
| 0536 |     |     |       |           |         |         |      |     |       |      |     |      |      |       |      |      |     |      |      |          |            |             |            |            |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN | POS | AIM | RD/16 | FIRE TIME | R O TIM         | TRG 2ND POSN    | RM        | OTHER MSUM | Q          | A NO       | REEL        | FRAME       | DATE    | BM | R | REG | DIV | AD |
|-----|-----|-----|-------|-----------|-----------------|-----------------|-----------|------------|------------|------------|-------------|-------------|---------|----|---|-----|-----|----|
| 0   | FSP | M   | A     | T         | 1ST SUB ALL     | M R POS         | G E       | C U F      | V R        | R          | MC          |             |         |    |   |     |     |    |
| 540 | 1   | 151 | 111   | 41        | 0.002           | 0.2 0.4 0.3 1 0 | 1 110     | 1112 1222  | 21071002   | 2000005790 | 036426      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 541 | 1   | 151 | 111   | 41        | 0.002           | 1.1 0.8 0.9 1 0 | 1 110     | 1112 1222  | 21081006   | 2000005790 | 036515      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 542 | 1   | 151 | 211   | 41        | 0.002           | 0.0 1.1 0.9 1 0 | 1 110     | 1112 1222  | 21071001   | 2000005790 | 036404      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 543 | 1   | 151 | 100   | 41        | 0.002           | 0.3 0.0 0.3 1 0 | 1 110     | 1112 1222  | 11071003   | 2000005790 | 036723      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 544 | 1   | 151 | 211   | 62        | 4.000           | 0.0 1.0 0.5 1 0 | 1 110     | 1122 1322  | 12061001   | 2000005790 | 037105      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 545 | 1   | 143 | 111   | 62        | 6.200           | 0.5 1.5 1.4 1 0 | 0 010     | 0000 0022  | 13042000   | 2000005790 | 040923      | 05016900015 | 0050000 | 24 |   |     |     |    |
| 546 | 1   | 133 | 111   | 11        | 0.000           | 1.2 1.2 1.2 1 0 | 3 031     | 0000 1222  | 12052000   | 1000001023 | 021212      | 00024400000 | 0000000 | 11 |   |     |     |    |
| 547 | 1   | 133 | 111   | 11        | 0.000           | 2.2 2.7 2.6 1 0 | 3 032     | 0000 1222  | 23062000   | 1000001023 | 027409      | 00024400000 | 0000000 | 11 |   |     |     |    |
| 548 | 1   | 133 | 111   | 11        | 0.000           | 2.2 2.1 2.1 1 0 | 3 132     | 0000 1222  | 23022000   | 1000001023 | 026211      | 00024400000 | 0000000 | 11 |   |     |     |    |
| 549 | 1   | 133 | 111   | 11        | 0.000           | 1.1 2.6 1.9 1 0 | 2 022     | 1121 1322  | 23052001   | 1000001023 | 054610      | 00024400000 | 0000000 | 11 |   |     |     |    |
| 550 | 1   | 133 | 111   | 11        | 0.000           | 0.5 3.4 2.5 1 0 | 2 023     | 0000 1222  | 23052000   | 1000001023 | 056110      | 00024400000 | 0000000 | 11 |   |     |     |    |
| 551 | 1   | 151 | 200   | 11        | 0.000           | 7.0 0.0 7.0 0 0 | 2 022     | 0000 1222  | 12032000   | 1000002070 | 057403      | 26064400000 | 0000000 | 12 |   |     |     |    |
| 552 | 1   | 153 | 111   | 11        | 0.000           | 1.0 0.0 0.5 1 0 | 3 432     | 0000 0021  | 23072000   | 1000001976 | 011614      | 27074400000 | 4420345 | 11 |   |     |     |    |
| 553 | 1   | 152 | 100   | 11        | 0.000           | 0.5 0.0 0.5 0 0 | 1 010     | 1111 1212  | 23052001   | 1000001951 | 021909      | 28024500000 | 0000945 | 11 |   |     |     |    |
| 554 | 1   | 153 | 100   | 11        | 0.000           | 1.3 0.0 1.3 0 1 | 1 021     | 1112 1211  | 11062002   | 1000001951 | 022002      | 28024500015 | 0000043 | 11 |   |     |     |    |
| 555 | 1   | 153 | 131   | 11        | 0.000           | 1.8 5.4 4.5 1 0 | 4 010     | 1112 1322  | 11012001   | 1000001951 | 058811      | 28024500515 | 0000043 | 11 |   |     |     |    |
| 556 | 1   | 153 | 111   | 11        | 0.000           | 2.7 2.2 2.4 1 0 | 4 410     | 1112 1322  | 11012003   | 1000001951 | 057114      | 28024500515 | 0000043 | 11 |   |     |     |    |
| 557 | 1   | 151 | 211   | 21        | 0.000           | 0.2 1.2 0.7 1 0 | 4 010     | 1122 1312  | 11032006   | 1000001512 | 078010      | 26064400000 | 3130795 | 11 |   |     |     |    |
| 558 | 1   | 151 | 100   | 52        | 4.000           | 1.3 0.0 2.2 0 0 | 5 010     | 1122 1322  | 11072003   | 1000002519 | 032512      | 00084400000 | 0000455 | 11 |   |     |     |    |
| 559 | 1   | 151 | 100   | 11        | 0.000           | 0.5 0.0 0.5 0 0 | 5 010     | 1122 1322  | 11072002   | 1000002519 | 033815      | 23124400015 | 3250045 | 11 |   |     |     |    |
| 560 | 1   | 156 | 211   | 52        | 4.000           | 0.4 2.8 1.6 1 0 | 2 122     | 0000 1222  | 12062000   | 1000003174 | 040901      | 24054400000 | 0000000 | 12 |   |     |     |    |
| 561 | 1   | 252 | 200   | 52        | 5.000           | 0.2 0.0 0.6 0 0 | 1 132     | 1121 1222  | 12062000   | 1000003174 | 051509      | 24054400000 | 0000000 | 12 |   |     |     |    |
| 562 | 1   | 151 | 200   | 21        | 0.000           | 0.2 0.0 0.2 0 0 | 4 010     | 0000 0022  | 12032000   | 1000003319 | 002709      | 40245000010 | 0390095 | 12 |   |     |     |    |
| 563 | 1   | 151 | 111   | 52        | 6.700           | 1.1 2.6 2.1 1 0 | 3 021     | 1121 1211  | 11092001   | 1000003344 | 010215      | 06024500000 | 1450000 | 12 |   |     |     |    |
| 564 | 1   | 151 | 111   | 52        | 4.000           | 0.4 1.1 0.9 1 0 | 3 021     | 1121 1211  | 11092001   | 1000003344 | 010215      | 06024500000 | 1450000 | 12 |   |     |     |    |
| 565 | 1   | 112 | 160   | 11        | 0.000           | 0.5 0.0 0.5 0 0 | 3 023     | 0000 1211  | 11022000   | 1000003344 | 011510      | 06024500000 | 1450000 | 12 |   |     |     |    |
| 566 | 1   | 555 | 160   | 11        | 0.000           | 2.5 0.0 2.5 0 0 | 3 023     | 1121 1211  | 11052002   | 1000003344 | 012313      | 06024500000 | 1450000 | 12 |   |     |     |    |
| 567 | 1   | 353 | 100   | 52        | 4.000           | 0.2 0.0 1.8 0 0 | 4 031     | 1121 0022  | 11042107   | 1000003732 | 007904      | 21034500000 | 3020945 | 11 |   |     |     |    |
| 568 | 1   | 353 | 100   | 52        | 4.000           | 0.5 0.9 0.7 1 0 | 4 031     | 1121 0022  | 11052101   | 1000003732 | 024115      | 21034500000 | 3020945 | 11 |   |     |     |    |
| 569 | 1   | 252 | 111   | 11        | 0.000           | 1.6 2.0 1.8 1 0 | 4 031     | 1222 0022  | 11042101   | 1000003732 | 024906      | 21034500000 | 3020945 | 11 |   |     |     |    |
| 570 | 1   | 252 | 141   | 52        | 4.000           | 0.2 0.0 4.0 0 0 | 2 010     | 0000 1222  | 11042000   | 1000003490 | 007813      | 23024500000 | 0000375 | 12 |   |     |     |    |
| 571 | 1   | 252 | 100   | 51        | 0.000           | 1.7 0.0 1.7 0 0 | 2 010     | 0000 1222  | 22052000   | 1000003490 | 007813      | 23024500000 | 0000375 | 12 |   |     |     |    |
| 572 | 1   | 151 | 100   | 51        | 0.000           | 1.2 1.2 1.2 1 0 | 2 033     | 1112 1222  | 23092002   | 1000003477 | 048014      | 17024500000 | 0000000 | 12 |   |     |     |    |
| 573 | 1   | 151 | 211   | 11        | 0.000           | 1.4 0.0 1.4 0 0 | 2 022     | 0000 1222  | 23072000   | 1000003477 | 051211      | 17024500000 | 0000000 | 12 |   |     |     |    |
| 574 | 1   | 151 | 100   | 21        | 0.000           | 1.4 0.0 1.4 0 0 | 2 010     | 1121 2322  | 11072002   | 1000003477 | 056406      | 17024500000 | 0000000 | 12 |   |     |     |    |
| 575 | 1   | 151 | 612   | 52        | 3.300           | 1.7 3.7 3.0 2 0 | 3 021     | 0000 1222  | 12052000   | 1000004148 | 028211      | 21044500000 | 5030000 | 12 |   |     |     |    |
| 576 | 1   | 152 | 100   | 11        | 0.000           | 4.0 1.0 4.1 0 0 | 3 021     | 0000 1222  | 12052000   | 1000004148 | 028211      | 21044500000 | 5030000 | 12 |   |     |     |    |
| 577 | 1   | 154 | 111   | 11        | 0.000           | 0.1 1.6 1.2 1 0 | 3 033     | 0000 1222  | 12062000   | 1000004148 | 028810      | 21044500000 | 5030000 | 12 |   |     |     |    |
| 578 | 1   | 152 | 111   | 52        | 4.500           | 2.8 3.4 3.1 1 0 | 2 110     | 1122 1222  | 12062000   | 1000003820 | 038702      | 10034500000 | 0000965 | 12 |   |     |     |    |
| 579 | 1   | 151 | 100   | 5212.000  | 0.5 0.0 2.6 0 1 | 0 010           | 1121 0022 | 11022003   | 1000004129 | 087815     | 23045000000 | 0000375     | 12      |    |   |     |     |    |
| 580 | 1   | 151 | 100   | 11        | 0.000           | 1.4 0.0 1.4 0 0 | 3 010     | 1221 1321  | 22032003   | 1000003871 | 072003      | 29034500000 | 0000331 | 11 |   |     |     |    |
| 581 | 1   | 151 | 100   | 11        | 0.000           | 0.4 0.0 0.4 0 0 | 4 010     | 0000 1222  | 13082000   | 1000003933 | 012308      | 08044500000 | 0160015 | 11 |   |     |     |    |
| 582 | 1   | 131 | 111   | 52        | 6.000           | 0.4 2.6 1.9 1 0 | 4 010     | 1122 1222  | 13052001   | 1000003933 | 012614      | 08044500000 | 0166015 | 11 |   |     |     |    |
| 583 | 1   | 131 | 111   | 11        | 0.000           | 7.3 4.3 5.8 1 0 | 4 021     | 1121 1221  | 11022002   | 1000003958 | 024810      | 12044500000 | 0000063 | 11 |   |     |     |    |
| 584 | 1   | 154 | 100   | 11        | 0.000           | 3.8 0.0 3.8 0 0 | 2 031     | 1121 1211  | 23042005   | 1000004016 | 013204      | 12044500000 | 0460053 | 11 |   |     |     |    |
| 585 | 1   | 154 | 100   | 11        | 0.000           | 1.2 0.0 1.2 0 1 | 2 022     | 1121 1222  | 13072003   | 1000004127 | 000610      | 24044500000 | 0000275 | 12 |   |     |     |    |
| 586 | 1   | 154 | 211   | 11        | 0.000           | 1.6 1.7 1.7 1 2 | 1 010     | 1122 1122  | 21092001   | 1000004127 | 011307      | 24044500000 | 0000275 | 12 |   |     |     |    |
| 587 | 1   | 154 | 100   | 11        | 0.000           | 1.5 0.0 1.5 0 0 | 4 032     | 1121 1222  | 11082001   | 1000004849 | 053308      | 22064500000 | 3050775 | 12 |   |     |     |    |
| 588 | 1   | 153 | 121   | 11        | 0.000           | 0.1 8.5 4.3 1 0 | 2 033     | 1121 2222  | 13072001   | 1000004849 | 056700      | 22064500000 | 3050775 | 12 |   |     |     |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN | POS | AIM | W | 16 | FIRE | TIME | R | D | TIM | TRG | 2ND | POSN | R | M | OTH | MSUM | Q | A | NO | REEL | FRAME | DATE | BN | B | R | REG | DIV | L |
|-----|-----|-----|---|----|------|------|---|---|-----|-----|-----|------|---|---|-----|------|---|---|----|------|-------|------|----|---|---|-----|-----|---|
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |
|     |     |     |   |    |      |      |   |   |     |     |     |      |   |   |     |      |   |   |    |      |       |      |    |   |   |     |     |   |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIH | RD/ | FIRE | TIME  | R   | D   | TIM  | TRG | 2ND | POSN | R    | M  | OTH | MSUM | Q    | A    | NO   | REEL     | FRAME      | DATE   | BN            | B        | R        | REG | DIV | B | MC | L |
|------|-----|-----|-----|------|-------|-----|-----|------|-----|-----|------|------|----|-----|------|------|------|------|----------|------------|--------|---------------|----------|----------|-----|-----|---|----|---|
| 0    |     |     | A   | 16   | SUB   | ALL | C   | I    | POS | PUL | FS   | M    | A  | D   | E    | C    | F    | CU   | QIRA     | V          | R      | AN            | S        |          |     |     |   |    |   |
| 0639 | 1   | 454 | 100 | 31   | 0.000 | 3.2 | 0.0 | 3.2  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.22 | 0000 | 1222 | 12032000 | 1000051236 | 011305 | 14016700023   | 03400043 | 03400043 | 14  |     |   |    |   |
| 0639 | 1   | 454 | 100 | 31   | 0.000 | 7.0 | 0.0 | 7.0  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1222 | 23052000 | 1000051236 | 011533 | 14016700023   | 03400043 | 03400043 | 14  |     |   |    |   |
| 0640 | 1   | 454 | 100 | 31   | 0.000 | 2.0 | 0.0 | 2.0  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1122 | 12032000 | 1000051236 | 016322 | 14016700023   | 03400043 | 03400043 | 14  |     |   |    |   |
| 0641 | 1   | 454 | 100 | 31   | 0.000 | 5.9 | 0.0 | 5.9  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1122 | 13042000 | 1000051236 | 017202 | 14016700023   | 03400043 | 03400043 | 14  |     |   |    |   |
| 0642 | 1   | 151 | 100 | 41   | 0.002 | 1.9 | 0.0 | 1.9  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 1112 | 1322 | 11032002 | 1000054773 | 036707 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0643 | 1   | 151 | 100 | 41   | 0.002 | 2.0 | 0.0 | 2.0  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 1112 | 1322 | 13012001 | 1000054773 | 036724 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0644 | 1   | 151 | 600 | 0225 | 6.00  | 0.0 | 0.0 | 5.6  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 1122 | 1322 | 23062002 | 1000054773 | 036212 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0645 | 1   | 151 | 600 | 6230 | 6.00  | 0.0 | 0.0 | 0.11 | 5.0 | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 1122 | 1322 | 12092002 | 1000054773 | 037002 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0646 | 1   | 151 | 600 | 6235 | 6.00  | 0.0 | 0.0 | 5.8  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 23072002 | 1000054773 | 036200 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0647 | 1   | 242 | 141 | 02   | 6.600 | 0.0 | 0.0 | 6.6  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 22072002 | 1000054773 | 037006 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0648 | 1   | 242 | 111 | 62   | 4.000 | 0.0 | 0.0 | 4.0  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 23102002 | 1000054773 | 037021 | 14016820020   | 0120019  | 0120019  | 14  |     |   |    |   |
| 0649 | 1   | 151 | 100 | 41   | 0.002 | 1.1 | 0.0 | 1.1  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1322 | 12032000 | 1000056532 | 011207 | 10037100000   | 0000053  | 0000053  | 14  |     |   |    |   |
| 0650 | 1   | 151 | 100 | 41   | 0.002 | 0.5 | 0.0 | 0.5  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1322 | 23032000 | 1000056532 | 011425 | 10037100000   | 0000053  | 0000053  | 14  |     |   |    |   |
| 0651 | 1   | 151 | 200 | 62   | 4.000 | 0.5 | 0.0 | 4.0  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1322 | 23032000 | 1000056532 | 011425 | 10037100000   | 0000053  | 0000053  | 14  |     |   |    |   |
| 0652 | 1   | 151 | 100 | 41   | 0.002 | 0.2 | 0.0 | 0.2  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 0000 | 1322 | 23042000 | 1000056532 | 011613 | 10037100000   | 0000053  | 0000053  | 14  |     |   |    |   |
| 0653 | 1   | 151 | 611 | 62   | 5.700 | 0.1 | 2.1 | 1.4  | 1   | 0   | 2.1  | 0.3  | 00 | 0   | 0    | 0.30 | 1122 | 1322 | 21082001 | 1000056532 | 014223 | 10037100000   | 0000053  | 0000053  | 14  |     |   |    |   |
| 0654 | 1   | 151 | 111 | 41   | 0.002 | 0.2 | 0.4 | 0.3  | 1   | 0   | 1.1  | 0.6  | 00 | 0   | 0    | 0.32 | 0000 | 1222 | 23082000 | 1000055951 | 001730 | 22087020035   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0655 | 1   | 232 | 111 | 41   | 0.002 | 0.2 | 5   | 0.4  | 3   | 0   | 0.0  | 0.5  | 00 | 0   | 0    | 0.33 | 0000 | 1322 | 13042000 | 1000055365 | 051725 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0656 | 1   | 252 | 111 | 41   | 0.002 | 0.1 | 6.5 | 0.4  | 1   | 0   | 0.0  | 0.10 | 00 | 0   | 0    | 0.33 | 0000 | 1322 | 23042000 | 1000055365 | 052323 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0657 | 1   | 744 | 200 | 6230 | 7.200 | 0.2 | 0.0 | 7.8  | 0   | 0   | 6.8  | 0.1  | 00 | 0   | 0    | 0.42 | 1121 | 1322 | 12072002 | 1000055365 | 047327 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0658 | 2   | 751 | 211 | 62   | 7.200 | 0.0 | 0.8 | 0.7  | 1   | 0   | 0.0  | 0.6  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 13062002 | 1000055365 | 052927 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0659 | 2   | 151 | 111 | 41   | 0.002 | 0.1 | 0.6 | 0.5  | 1   | 0   | 0.0  | 0.6  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 11052001 | 1000055365 | 053224 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0660 | 2   | 141 | 100 | 61   | 0.000 | 2.4 | 0.0 | 2.4  | 0   | 0   | 0.3  | 0.1  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 13042002 | 1000055365 | 054804 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0661 | 2   | 141 | 111 | 62   | 6.000 | 0.0 | 2.8 | 2.1  | 1   | 0   | 0.0  | 0.04 | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 12042032 | 1000055365 | 055323 | 04017000025   | 0220255  | 0220255  | 14  |     |   |    |   |
| 0662 | 1   | 751 | 600 | 5218 | 6.00  | 0.0 | 0.0 | 3.7  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 0000 | 1222 | 23062000 | 100008262  | 031203 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0663 | 1   | 252 | 111 | 11   | 0.000 | 0.5 | 0.8 | 0.7  | 1   | 0   | 0.0  | 0.4  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 13082002 | 100008262  | 063009 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0664 | 1   | 212 | 111 | 52   | 4.000 | 0.0 | 4.2 | 2.1  | 1   | 0   | 0.0  | 0.2  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 13082002 | 100008262  | 063009 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0665 | 1   | 252 | 111 | 11   | 0.000 | 2.1 | 1.6 | 1.8  | 1   | 0   | 0.0  | 0.4  | 00 | 0   | 0    | 0.32 | 0000 | 1222 | 13062000 | 100008262  | 024413 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0666 | 1   | 151 | 111 | 11   | 0.000 | 0.5 | 0.3 | 0.4  | 1   | 0   | 0.0  | 0.5  | 00 | 0   | 0    | 0.20 | 1112 | 1222 | 11032002 | 100008262  | 035812 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0667 | 1   | 151 | 211 | 21   | 0.000 | 0.0 | 0.2 | 0.2  | 1   | 0   | 0.0  | 0.20 | 00 | 0   | 0    | 0.10 | 1112 | 1222 | 12042003 | 100008262  | 035812 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0668 | 1   | 151 | 211 | 22   | 4.000 | 0.2 | 1.5 | 1.1  | 1   | 2   | 0.9  | 0.3  | 00 | 0   | 0    | 0.10 | 0000 | 1122 | 22022000 | 100008262  | 036511 | 18055000000   | 0000000  | 0000000  | 13  |     |   |    |   |
| 0669 | 1   | 212 | 100 | 11   | 0.000 | 0.7 | 0.0 | 0.7  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1121 | 0022 | 21042002 | 100008262  | 074412 | 06055020000   | 0080000  | 0080000  | 13  |     |   |    |   |
| 0670 | 1   | 212 | 111 | 11   | 0.000 | 0.5 | 0.9 | 0.8  | 1   | 1   | 0.0  | 0.6  | 00 | 0   | 0    | 0.33 | 1122 | 0022 | 23082001 | 100008262  | 075214 | 06055020000   | 0080000  | 0080000  | 13  |     |   |    |   |
| 0671 | 1   | 151 | 100 | 11   | 0.000 | 2.7 | 0.0 | 2.7  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.10 | 0000 | 1322 | 21062000 | 100008163  | 066011 | 12085020000   | 0000019  | 0000019  | 13  |     |   |    |   |
| 0672 | 1   | 751 | 200 | 11   | 0.000 | 0.4 | 0.0 | 0.4  | 0   | 0   | 1.0  | 0.1  | 00 | 0   | 0    | 0.30 | 0000 | 1322 | 23062000 | 100008163  | 067005 | 12085020000   | 0000019  | 0000019  | 13  |     |   |    |   |
| 0673 | 1   | 232 | 100 | 11   | 0.000 | 5.4 | 0.0 | 5.4  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1122 | 1322 | 13022002 | 100008126  | 056413 | 25075000000   | 0000275  | 0000275  | 13  |     |   |    |   |
| 0674 | 1   | 131 | 111 | 11   | 0.000 | 2.0 | 1.1 | 1.5  | 1   | 0   | 0.0  | 0.3  | 00 | 0   | 0    | 0.33 | 1111 | 1211 | 11042005 | 100008120  | 052315 | 24075020000   | 0000019  | 0000019  | 13  |     |   |    |   |
| 0675 | 1   | 252 | 122 | 21   | 0.000 | 0.4 | 1.9 | 1.4  | 3   | 0   | 0.0  | 0.3  | 00 | 0   | 0    | 0.02 | 1111 | 1311 | 11072006 | 100008120  | 052315 | 24075020000   | 0000019  | 0000019  | 13  |     |   |    |   |
| 0676 | 1   | 252 | 111 | 11   | 0.000 | 0.6 | 1.2 | 1.1  | 1   | 0   | 1.2  | 0.5  | 00 | 0   | 0    | 0.02 | 1121 | 1311 | 12092003 | 100008120  | 053200 | 24075020000   | 0000019  | 0000019  | 13  |     |   |    |   |
| 0677 | 1   | 151 | 111 | 22   | 6.500 | 0.1 | 7.7 | 3.9  | 1   | 1   | 0.0  | 0.2  | 00 | 0   | 0    | 0.33 | 1111 | 0011 | 22102004 | 100008115  | 031201 | 19075000025   | 0210019  | 0210019  | 13  |     |   |    |   |
| 0678 | 1   | 151 | 100 | 11   | 0.000 | 0.6 | 0.0 | 0.6  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.33 | 1111 | 0011 | 23072001 | 100008115  | 031305 | 19075000025   | 0210245  | 0210245  | 13  |     |   |    |   |
| 0679 | 1   | 252 | 111 | 52   | 2.500 | 0.0 | 0.8 | 0.4  | 1   | 0   | 0.0  | 0.2  | 00 | 0   | 0    | 0.10 | 0000 | 0022 | 11082000 | 100008115  | 036114 | 19075000025   | 0210245  | 0210245  | 13  |     |   |    |   |
| 0680 | 1   | 343 | 111 | 52   | 8.000 | 0.0 | 7.3 | 3.7  | 1   | 0   | 0.0  | 0.2  | 00 | 0   | 0    | 0.33 | 1121 | 1322 | 11072001 | 100008106  | 054609 | 19075012000   | 0020000  | 0020000  | 13  |     |   |    |   |
| 0681 | 1   | 252 | 100 | 11   | 0.000 | 2.1 | 0.0 | 2.1  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 1121 | 1322 | 23082004 | 1000084534 | 054609 | 19075012000   | 0020000  | 0020000  | 13  |     |   |    |   |
| 0682 | 1   | 252 | 100 | 11   | 0.000 | 0.1 | 0.0 | 0.1  | 0   | 0   | 0.0  | 0.1  | 00 | 0   | 0    | 0.32 | 1121 | 1322 | 23082004 | 1000084534 | 054609 | 19075012000   | 0020000  | 0020000  | 13  |     |   |    |   |
| 0683 | 1   | 232 | 11  | 11   | 0.000 | 0.6 | 3.9 | 2.3  | 1   | 0   | 0.0  | 0.2  | 00 | 0   | 0    | 0.33 | 0000 | 1221 | 22082000 | 1000084534 | 054609 | 19075012000   | 0020000  | 0020000  | 13  |     |   |    |   |
| 0684 | 1   | 131 | 111 | 11   | 0.000 | 3.1 | 0.7 | 1.0  | 1   | 0   | 0.0  | 0.8  | 00 | 0   | 0    | 0.33 | 1122 | 1321 | 11052001 | 100008468  | 026705 | 07625100000   | 0000275  | 0000275  | 13  |     |   |    |   |
| 0685 | 1   | 454 | 111 | 11   | 0.000 | 1.2 | 1.2 | 1.2  | 1   | 0   | 0.0  | 0.6  | 00 | 0   | 0    | 0.10 | 0000 | 1321 | 11072000 | 100008466  | 030314 | 31015100893</ |          |          |     |     |   |    |   |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE TIME | R D TIM | THG 2ND POSN | R M     | OTHR MSUM | Q       | A NO | REEL | FRAME | DATE | BN | R   | REG  | DIV  | AO       |            |        |             |         |      |             |         |      |             |         |     |             |         |    |
|------|-----|-----|-------|-----------|---------|--------------|---------|-----------|---------|------|------|-------|------|----|-----|------|------|----------|------------|--------|-------------|---------|------|-------------|---------|------|-------------|---------|-----|-------------|---------|----|
| FSP  | Y   | A   | BUR   | 1ST       | SUB     | ALL          | H R POS | C I TO    | M R POS | PUL  | FS   | M A D | E    | G  | E   | C    | F    | VZHN     | AN S       | V R    | MSUM        | O       | A NO | REEL        | FRAME   | DATE | BN          | R       | REG | DIV         | AO      |    |
| 0687 | 2   | 131 | 100   | 21        | 0.000   | 1.2          | 0.0     | 1.2       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 031 | 0000 | 1221 | 23022000 | 1000009463 | 016501 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0688 | 2   | 131 | 111   | 11        | 0.000   | 2.7          | 2.6     | 2.6       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 3  | 023 | 1111 | 1321 | 23022002 | 1000009463 | 018301 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0689 | 2   | 131 | 132   | 11        | 0.000   | 0.7          | 7.2     | 4.0       | 1.0     | 0.0  | 0.2  | 0.0   | 0.0  | 4  | 033 | 1111 | 1321 | 23022001 | 1000009463 | 018301 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0690 | 2   | 111 | 111   | 11        | 0.000   | 0.4          | 1.2     | 0.9       | 1.0     | 0.0  | 0.4  | 0.0   | 0.0  | 4  | 033 | 1111 | 1221 | 13012002 | 1000009463 | 019609 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0691 | 2   | 111 | 111   | 11        | 0.000   | 0.9          | 1.2     | 1.1       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 4  | 033 | 1111 | 1321 | 13012001 | 1000009463 | 019711 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0692 | 2   | 111 | 111   | 11        | 0.000   | 0.3          | 1.3     | 1.1       | 1.0     | 0.0  | 0.6  | 0.0   | 0.0  | 4  | 033 | 1111 | 1321 | 13012002 | 1000009463 | 020313 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0693 | 2   | 111 | 100   | 11        | 0.000   | 1.0          | 0.0     | 1.0       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 033 | 1111 | 1321 | 13012001 | 1000009463 | 020312 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0694 | 2   | 131 | 100   | 11        | 0.000   | 1.9          | 0.0     | 1.9       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 033 | 0000 | 1321 | 23062000 | 1000009463 | 021413 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0695 | 2   | 131 | 100   | 11        | 0.000   | 1.9          | 0.0     | 1.9       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 033 | 0000 | 1321 | 23062000 | 1000009463 | 022615 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0696 | 2   | 111 | 100   | 11        | 0.000   | 1.5          | 0.0     | 1.5       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 033 | 1121 | 1321 | 13022001 | 1000009463 | 023307 | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13   | 13015100000 | 0000000 | 13  | 13015100000 | 0000000 | 13 |
| 0697 | 2   | 131 | 111   | 52        | 3.000   | 0.2          | 2.4     | 1.6       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 4  | 033 | 1121 | 1321 | 23012001 | 1000009414 | 061308 | 25065120000 | 0000000 | 13   | 25065120000 | 0000000 | 13   | 25065120000 | 0000000 | 13  | 25065120000 | 0000000 | 13 |
| 0698 | 2   | 131 | 100   | 11        | 0.000   | 0.1          | 0.0     | 0.1       | 1.0     | 0.0  | 0.1  | 0.0   | 0.0  | 4  | 033 | 1121 | 1321 | 23022001 | 1000009414 | 062015 | 25065120000 | 0000000 | 13   | 25065120000 | 0000000 | 13   | 25065120000 | 0000000 | 13  | 25065120000 | 0000000 | 13 |
| 0699 | 1   | 151 | 111   | 52        | 3.700   | 0.1          | 0.9     | 0.7       | 1.2     | 0.0  | 0.3  | 0.0   | 0.0  | 0  | 022 | 1121 | 0022 | 11042102 | 1000009363 | 022205 | 17115100000 | 0000000 | 13   | 17115100000 | 0000000 | 13   | 17115100000 | 0000000 | 13  | 17115100000 | 0000000 | 13 |
| 0700 | 1   | 454 | 111   | 52        | 4.700   | 1.3          | 4.9     | 3.7       | 1.0     | 0.0  | 0.5  | 0.0   | 0.0  | 0  | 032 | 1111 | 0022 | 11082001 | 1000009184 | 036214 | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13  | 00000000000 | 0000000 | 13 |
| 0701 | 1   | 252 | 100   | 22        | 5.000   | 1.7          | 0.0     | 2.7       | 1.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 032 | 1111 | 0022 | 11082002 | 1000009184 | 037002 | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13  | 00000000000 | 0000000 | 13 |
| 0702 | 1   | 212 | 100   | 11        | 0.000   | 1.5          | 0.0     | 1.5       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 2  | 032 | 0000 | 1222 | 23062000 | 1000009184 | 047203 | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13  | 00000000000 | 0000000 | 13 |
| 0703 | 1   | 252 | 111   | 52        | 4.500   | 0.6          | 1.9     | 1.6       | 1.0     | 0.0  | 0.4  | 0.0   | 0.0  | 0  | 022 | 1111 | 0022 | 23032004 | 1000009184 | 053714 | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13  | 00000000000 | 0000000 | 13 |
| 0704 | 1   | 252 | 100   | 52        | 4.000   | 0.2          | 0.0     | 2.8       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 033 | 0000 | 0022 | 12042000 | 1000009184 | 055308 | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13   | 00000000000 | 0000000 | 13  | 00000000000 | 0000000 | 13 |
| 0705 | 1   | 151 | 100   | 21        | 0.000   | 1.0          | 0.0     | 1.0       | 1.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 010 | 1121 | 0012 | 12022001 | 1000008372 | 073003 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0706 | 1   | 131 | 100   | 21        | 0.000   | 2.3          | 0.0     | 2.3       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 031 | 0000 | 0011 | 12032000 | 1000008372 | 082909 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0707 | 1   | 131 | 100   | 52        | 4.000   | 7.1          | 0.0     | 7.7       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 031 | 0000 | 0011 | 12092003 | 1000008372 | 085813 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0708 | 1   | 131 | 100   | 52        | 3.000   | 9.6          | 0.0     | 10.2      | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 031 | 1121 | 0011 | 13102001 | 1000008372 | 087110 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0709 | 1   | 252 | 100   | 11        | 0.000   | 3.0          | 0.0     | 3.0       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 010 | 0000 | 0022 | 21022000 | 1000008370 | 052501 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0710 | 1   | 454 | 111   | 11        | 0.000   | 1.6          | 3.7     | 2.6       | 1.2     | 0.0  | 0.2  | 0.0   | 0.0  | 7  | 010 | 1122 | 1322 | 11062001 | 1000008370 | 054515 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0711 | 1   | 252 | 141   | 11        | 0.000   | 0.8          | 2.2     | 1.5       | 1.2     | 0.0  | 0.2  | 0.0   | 0.0  | 7  | 010 | 1112 | 1322 | 23022003 | 1000008370 | 055706 | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13   | 25095000000 | 0000000 | 13  | 25095000000 | 0000000 | 13 |
| 0712 | 1   | 343 | 142   | 52        | 3.000   | 0.4          | 5.8     | 4.0       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 0  | 010 | 1112 | 0022 | 23022001 | 1000008680 | 032006 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0713 | 1   | 353 | 100   | 11        | 0.000   | 2.6          | 0.0     | 2.6       | 0.0     | 0.0  | 0.1  | 0.0   | 0.0  | 0  | 010 | 1112 | 0022 | 23012002 | 1000008680 | 032006 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0714 | 1   | 252 | 111   | 11        | 0.000   | 0.0          | 0.6     | 0.5       | 1.0     | 0.0  | 0.5  | 0.0   | 0.0  | 0  | 010 | 0000 | 0022 | 12042000 | 1000008680 | 033211 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0715 | 1   | 252 | 111   | 11        | 0.000   | 0.6          | 0.7     | 0.7       | 1.0     | 0.0  | 0.6  | 0.0   | 0.0  | 3  | 010 | 0000 | 1322 | 12042000 | 1000008680 | 034308 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0716 | 1   | 353 | 142   | 11        | 0.000   | 5.0          | 1.1     | 1.6       | 1.0     | 0.0  | 0.7  | 0.0   | 0.0  | 5  | 032 | 0000 | 1322 | 12042000 | 1000008680 | 035409 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0717 | 1   | 353 | 100   | 11        | 0.000   | 0.5          | 0.0     | 0.5       | 0.0     | 1.7  | 0.1  | 0.0   | 0.0  | 5  | 032 | 0000 | 1322 | 12042000 | 1000008680 | 038002 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0718 | 1   | 151 | 111   | 21        | 0.000   | 0.3          | 0.9     | 0.8       | 1.0     | 6.0  | 0.9  | 0.0   | 0.0  | 0  | 010 | 0000 | 0022 | 23112000 | 1000008680 | 038107 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0719 | 1   | 343 | 142   | 52        | 4.700   | 0.1          | 5.5     | 3.7       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 0  | 010 | 0000 | 0022 | 23022000 | 1000008680 | 039308 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0720 |     |     |       |           |         |              |         |           |         |      |      |       |      |    |     |      |      |          |            |        |             |         |      |             |         |      |             |         |     |             |         |    |
| 0721 | 1   | 254 | 111   | 11        | 0.000   | 0.4          | 0.8     | 0.6       | 1.0     | 4.0  | 0.2  | 0.0   | 0.0  | 0  | 010 | 1122 | 0022 | 12032001 | 1000008680 | 055015 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0722 | 1   | 353 | 142   | 11        | 0.000   | 3.5          | 1.6     | 2.2       | 1.0     | 0.0  | 0.3  | 0.0   | 0.0  | 0  | 010 | 1121 | 0022 | 12022001 | 1000008680 | 055411 | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13   | 29015120000 | 0000000 | 13  | 29015120000 | 0000000 | 13 |
| 0723 | 1   | 151 | 111   | 11        | 0.000   | 1.7          | 2.3     | 2.0       | 1.1     | 0.0  | 0.2  | 0.0   | 0.0  | 0  | 010 | 1122 | 0022 | 23022001 | 1000008695 | 072208 | 06025100000 | 0000000 | 13   | 06025100000 | 0000000 | 13   | 06025100000 | 0000000 | 13  | 06025100000 | 0000000 | 13 |
| 0724 | 1   | 151 | 100   | 11        | 0.000   | 0.2          | 0.0     | 0.2       | 0.0     | 0.4  | 0.1  | 0.0   | 0.0  | 0  | 210 | 1122 |      |          |            |        |             |         |      |             |         |      |             |         |     |             |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE | TIME   | R   | C   | I   | T   | M   | PUL | FS  | M   | A   | D   | E   | C   | F   | VZBN | Q   | A   | NO  | WEEL | FRAME | DATE | UN  | B   | R   | REG | DIV | AO  | B   | MC  |  |
|------|-----|-----|-------|------|--------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|-----|-----|-----|------|-------|------|-----|-----|-----|-----|-----|-----|-----|-----|--|
|      |     | FSP | M     | A    | T      | IST | SUB | ALL | H   | R   | POS |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0735 | 2   | 131 | 111   | 11   | 0.000  | 1.7 | 1.0 | 1.1 | 1.2 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0737 | 2   | 131 | 111   | 11   | 0.000  | 0.7 | 1.0 | 1.0 | 1.2 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0738 | 2   | 131 | 111   | 52   | 3.000  | 0.3 | 1.3 | 1.1 | 1.2 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0739 | 2   | 131 | 111   | 11   | 0.000  | 0.2 | 0.4 | 0.4 | 1.2 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0740 | 2   | 131 | 111   | 11   | 0.000  | 0.0 | 1.9 | 1.5 | 1.2 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0741 | 1   | 151 | 241   | 11   | 0.000  | 0.5 | 1.7 | 1.3 | 1.0 | 0.6 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0742 |     |     |       |      |        |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0743 |     |     |       |      |        |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0744 |     |     |       |      |        |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0745 |     |     |       |      |        |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0746 |     |     |       |      |        |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |
| 0747 | 1   | 151 | 100   | 11   | 0.000  | 0.2 | 0.0 | 0.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0748 | 1   | 151 | 111   | 11   | 0.000  | 0.8 | 0.3 | 0.5 | 1.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0749 | 1   | 151 | 111   | 52   | 2.100  | 0.7 | 1.1 | 1.0 | 1.0 | 0.0 | 0.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0750 | 1   | 153 | 111   | 11   | 0.000  | 0.4 | 1.4 | 1.3 | 1.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0751 | 1   | 153 | 111   | 11   | 0.000  | 0.7 | 1.0 | 0.8 | 1.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0752 | 1   | 153 | 111   | 11   | 0.000  | 4.3 | 1.0 | 2.7 | 1.1 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0753 | 2   | 131 | 100   | 52   | 5.000  | 6.0 | 0.0 | 0.8 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0754 | 2   | 131 | 100   | 11   | 0.000  | 1.1 | 0.0 | 1.1 | 0.2 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0755 | 2   | 131 | 111   | 11   | 0.000  | 0.7 | 1.2 | 1.1 | 1.2 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0756 | 1   | 252 | 111   | 52   | 2.600  | 1.2 | 2.3 | 2.1 | 1.1 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0757 | 1   | 151 | 100   | 11   | 0.000  | 0.1 | 0.0 | 0.1 | 0.0 | 1.5 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0758 | 1   | 151 | 111   | 11   | 0.000  | 1.8 | 2.4 | 2.1 | 1.0 | 0.4 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0759 | 1   | 152 | 211   | 11   | 0.000  | 2.4 | 2.0 | 2.0 | 1.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0760 | 1   | 151 | 111   | 11   | 0.000  | 1.7 | 2.0 | 1.9 | 1.1 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0761 | 1   | 252 | 111   | 52   | 3.600  | 1.1 | 2.0 | 1.8 | 1.1 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0762 | 1   | 252 | 111   | 52   | 3.600  | 0.7 | 0.8 | 0.8 | 1.1 | 4.2 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0763 | 1   | 151 | 242   | 22   | 2.500  | 0.3 | 3.1 | 1.7 | 2.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0764 | 1   | 151 | 211   | 21   | 0.000  | 1.6 | 0.7 | 0.9 | 1.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0765 | 2   | 131 | 111   | 21   | 0.000  | 1.4 | 1.7 | 1.7 | 1.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0766 | 2   | 131 | 111   | 21   | 0.000  | 0.2 | 0.7 | 0.6 | 1.2 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0767 | 2   | 141 | 111   | 52   | 5.000  | 1.5 | 8.2 | 4.9 | 1.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0768 | 2   | 141 | 111   | 52   | 8.000  | 0.5 | 3.8 | 2.2 | 1.0 | 0.0 | 0.2 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0769 | 2   | 141 | 100   | 52   | 14.000 | 0.9 | 3.0 | 2.2 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0770 | 2   | 131 | 111   | 11   | 0.000  | 0.0 | 1.1 | 0.8 | 1.0 | 0.0 | 0.4 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0771 | 2   | 151 | 111   | 11   | 0.000  | 0.1 | 0.8 | 0.6 | 1.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0772 | 1   | 242 | 200   | 62   | 8.000  | 1.0 | 0.0 | 0.6 | 1.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0773 | 1   | 242 | 200   | 62   | 12.000 | 8.8 | 0.0 | 1.5 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0774 | 1   | 751 | 200   | 52   | 6.000  | 0.1 | 0.0 | 2.7 | 0.0 | 2.0 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0775 | 1   | 751 | 211   | 52   | 6.000  | 6.1 | 2.9 | 4.0 | 1.0 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0776 | 1   | 751 | 242   | 52   | 6.000  | 7.7 | 3.1 | 4.0 | 1.0 | 0.0 | 0.5 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0777 | 1   | 751 | 211   | 52   | 2.500  | 0.6 | 1.3 | 1.0 | 1.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0778 | 1   | 751 | 211   | 52   | 2.500  | 4.2 | 2.0 | 2.0 | 1.0 | 0.0 | 0.6 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0779 | 1   | 751 | 211   | 52   | 3.200  | 3.0 | 2.3 | 2.4 | 1.0 | 0.0 | 0.7 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0780 | 1   | 751 | 200   | 51   | 0.000  | 1.1 | 0.0 | 1.1 | 0.0 | 2.2 | 0.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0.0 | 0.0  | 0.0   | 0.0  | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |  |
| 0781 | 1   | 751 | 211   | 52   | 3.00   |     |     |     |     |     |     |     |     |     |     |     |     |     |      |     |     |     |      |       |      |     |     |     |     |     |     |     |     |  |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/ | FIRE | TIME  | R       | D   | C   | I   | TO | TIM | PUL | FS | M | A | D | R | M   | G    | E    | C | U | OTHR | MSUM | Q        | A           | NO     | REEL        | FRAME   | DATE    | BN      | B       | R       | REG     | MC      | AO |
|------|-----|-----|-----|------|-------|---------|-----|-----|-----|----|-----|-----|----|---|---|---|---|-----|------|------|---|---|------|------|----------|-------------|--------|-------------|---------|---------|---------|---------|---------|---------|---------|----|
|      |     |     | BUR | 16   | SUB   | ALL     | HT  | POS | POS | TO | POS | PUL | FS | M | A | D | R | M   | G    | E    | C | U | OTHR | MSUM | Q        | A           | NO     | REEL        | FRAME   | DATE    | BN      | B       | R       | REG     | MC      | AO |
| 0785 | 1   | 751 | 211 | 21   | 0.000 | 1.4     | 1.8 | 1.7 | 1   | 0  | 0.0 | 0.4 | 00 | 0 | 0 | 0 | 0 | 022 | 1112 | 0022 |   |   |      |      | 12072001 | 2000000551  | 058405 | 00004400000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0786 | 3   | 751 | 611 | 21   | 0.000 | 0.5     | 1.5 | 0.4 | 1   | 0  | 0.7 | 09  | 00 | 0 | 0 | 0 | 0 | 422 | 1112 | 0022 |   |   |      |      | 12062001 | 2000000551  | 059810 | 00004400000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0787 | 1   | 157 | 200 | 11   | 0.000 | 0.5     | 0.0 | 0.5 | 0   | 0  | 2.0 | 0   | 00 | 0 | 0 | 0 | 2 | 210 | 1122 | 1222 |   |   |      |      | 23042003 | 2000000558  | 033405 | 12054500035 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 22 |
| 0788 | 1   | 751 | 241 | 52   | 2.000 | 0.2     | 2.6 | 1.4 | 1   | 0  | 0.5 | 02  | 00 | 0 | 0 | 0 | 1 | 110 | 1122 | 1222 |   |   |      |      | 11062003 | 2000000558  | 033405 | 12054500035 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 0220065 | 22 |
| 0789 | 1   | 151 | 142 | 11   | 0.000 | 1.0     | 3.7 | 2.4 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 1 | 033 | 0000 | 1222 |   |   |      |      | 23102100 | 2000000471  | 018311 | 20074400035 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 22 |
| 0790 | 1   | 151 | 111 | 52   | 5.000 | 0.3     | 1.6 | 1.0 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 010 | 1122 | 0022 |   |   |      |      | 23062002 | 2000000971  | 027600 | 20074400035 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 22 |
| 0791 | 1   | 131 | 600 | 52   | 9.000 | 1.5     | 0.0 | 2.4 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 0000 | 0022 |   |   |      |      | 23032000 | 2000000971  | 042515 | 24094400035 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 22 |
| 0792 | 3   | 454 | 111 | 52   | 3.800 | 0.8     | 1.1 | 1.1 | 1   | 0  | 0.0 | 05  | 00 | 0 | 0 | 0 | 0 | 033 | 0000 | 0022 |   |   |      |      | 23022003 | 2000000972  | 065506 | 24094400035 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 22 |
| 0793 | 3   | 131 | 111 | 52   | 4.500 | 0.5     | 3.4 | 1.9 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 033 | 0000 | 0022 |   |   |      |      | 23082000 | 2000000972  | 007904 | 24094400000 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 0000015 | 22 |
| 0794 | 1   | 131 | 100 | 52   | 7.000 | 3.310.5 | 8.7 | 1   | 0   | 0  | 0.0 | 04  | 00 | 0 | 0 | 0 | 0 | 033 | 1121 | 0022 |   |   |      |      | 11082002 | 2000000974  | 034104 | 29094400035 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 22 |
| 0795 | 1   | 131 | 100 | 52   | 7.000 | 1.0     | 0.0 | 1.2 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 0000 | 0022 |   |   |      |      | 13022000 | 2000000974  | 036305 | 29094400035 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 0050000 | 22 |
| 0796 | 1   | 454 | 211 | 11   | 6.000 | 0.4     | 1.2 | 0.9 | 1   | 0  | 0.0 | 03  | 00 | 0 | 0 | 0 | 2 | 010 | 1122 | 1222 |   |   |      |      | 12072002 | 2000000974  | 061613 | 28094400025 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 22 |
| 0797 | 1   | 252 | 121 | 11   | 0.000 | 0.5     | 3.2 | 1.9 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 010 | 1121 | 0022 |   |   |      |      | 23092002 | 2000000974  | 061903 | 28094400025 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 22 |
| 0798 | 1   | 151 | 111 | 52   | 4.000 | 2.3     | 3.7 | 3.0 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 010 | 1121 | 0022 |   |   |      |      | 13112003 | 2000000974  | 062615 | 28094400025 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 0070000 | 22 |
| 0799 | 1   | 151 | 100 | 21   | 0.000 | 5.0     | 0.0 | 5.0 | 0   | 0  | 4.0 | 01  | 00 | 0 | 0 | 0 | 0 | 010 | 1122 | 0022 |   |   |      |      | 13052001 | 2000000977  | 017709 | 25014400025 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 22 |
| 0800 | 3   | 151 | 111 | 11   | 0.000 | 1.2     | 3.5 | 2.4 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 031 | 0000 | 0022 |   |   |      |      | 23022000 | 2000000977  | 020714 | 25014400025 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 12 |
| 0801 | 3   | 131 | 100 | 21   | 0.000 | 0.3     | 0.9 | 0.3 | 1   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 1 | 010 | 1121 | 1122 |   |   |      |      | 23022005 | 2000000977  | 036914 | 25014400025 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 22 |
| 0802 | 1   | 151 | 100 | 11   | 0.000 | 0.0     | 0.0 | 0.0 | 0   | 1  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 031 | 0000 | 0022 |   |   |      |      | 23022000 | 2000000977  | 020714 | 25014400025 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 3210000 | 12 |
| 0803 | 1   | 151 | 300 | 11   | 0.000 | 1.9     | 0.0 | 1.9 | 0   | 0  | 2.7 | 01  | 00 | 0 | 0 | 0 | 1 | 010 | 1122 | 2122 |   |   |      |      | 11082001 | 2000001013  | 020903 | 15094400000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0804 | 1   | 252 | 300 | 11   | 0.000 | 0.8     | 0.0 | 0.8 | 0   | 0  | 2.7 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 1121 | 0021 |   |   |      |      | 23042007 | 20000004726 | 015101 | 00004400000 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 22 |
| 0805 | 1   | 151 | 111 | 11   | 0.000 | 0.3     | 1.0 | 0.5 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 2 | 033 | 1122 | 1221 |   |   |      |      | 23082002 | 20000004726 | 015101 | 00004400000 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 22 |
| 0806 | 1   | 252 | 111 | 11   | 0.000 | 1.4     | 1.6 | 1.5 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 023 | 0000 | 0021 |   |   |      |      | 13072000 | 20000004726 | 018500 | 00004400000 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 22 |
| 0807 | 1   | 254 | 100 | 11   | 0.000 | 1.9     | 0.0 | 1.9 | 0   | 0  | 3.7 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 1121 | 0021 |   |   |      |      | 23022003 | 20000004726 | 018500 | 00004400000 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 0000025 | 22 |
| 0808 | 1   | 151 | 111 | 52   | 4.000 | 0.1     | 0.7 | 0.5 | 1   | 0  | 0.0 | 03  | 00 | 0 | 0 | 0 | 1 | 010 | 1121 | 1122 |   |   |      |      | 22022002 | 20000004718 | 047508 | 00004500000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0809 | 1   | 151 | 132 | 52   | 4.500 | 0.8     | 3.4 | 2.1 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 023 | 0000 | 0022 |   |   |      |      | 23022000 | 20000004718 | 050006 | 00004500000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0810 | 1   | 151 | 100 | 11   | 0.000 | 0.6     | 0.0 | 0.6 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 010 | 1122 | 0022 |   |   |      |      | 12032002 | 20000004709 | 008211 | 00024500000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0811 | 1   | 151 | 100 | 11   | 0.000 | 0.1     | 0.0 | 0.1 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 022 | 1122 | 0022 |   |   |      |      | 23022001 | 20000004709 | 009514 | 00024500000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0812 | 1   | 151 | 100 | 11   | 0.000 | 1.6     | 0.0 | 1.6 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 4 | 021 | 0000 | 1321 |   |   |      |      | 11062000 | 2000001795  | 000001 | 00024500000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0813 | 1   | 151 | 211 | 21   | 0.000 | 0.3     | 0.8 | 0.6 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 1 | 010 | 1122 | 1121 |   |   |      |      | 23082002 | 2000001793  | 023105 | 23074400000 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 12 |
| 0814 | 1   | 252 | 111 | 11   | 0.000 | 2.0     | 2.5 | 2.2 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 032 | 1121 | 0022 |   |   |      |      | 23022002 | 2000001791  | 067202 | 10074400000 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 22 |
| 0815 | 3   | 454 | 100 | 21   | 0.000 | 3.0     | 0.0 | 3.0 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 1121 | 0021 |   |   |      |      | 22022001 | 2000001640  | 011213 | 01084400000 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 22 |
| 0816 | 3   | 454 | 100 | 21   | 0.000 | 2.2     | 0.0 | 2.2 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 033 | 1121 | 0021 |   |   |      |      | 23022002 | 2000001640  | 011213 | 01084400000 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 0000035 | 22 |
| 0817 | 3   | 434 | 100 | 11   | 0.000 | 0.5     | 1.6 | 1.0 | 1   | 0  | 0.0 | 02  | 00 | 0 | 0 | 0 | 0 | 010 | 0000 | 0022 |   |   |      |      | 23032000 | 2000000830  | 065510 | 18094400000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0818 | 1   | 151 | 111 | 21   | 0.000 | 0.9     | 1.3 | 1.2 | 1   | 0  | 0.0 | 04  | 00 | 0 | 0 | 0 | 2 | 023 | 0000 | 1222 |   |   |      |      | 13082000 | 2000000830  | 006404 | 18094400000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0819 | 1   | 253 | 111 | 21   | 0.000 | 0.4     | 0.0 | 0.4 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 022 | 0000 | 0022 |   |   |      |      | 23032000 | 2000000137  | 024815 | 00124300000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0820 | 3   | 151 | 100 | 51   | 0.000 | 1.5     | 0.0 | 1.5 | 0   | 0  | 2.5 | 01  | 00 | 0 | 0 | 0 | 0 | 022 | 1121 | 0022 |   |   |      |      | 23032002 | 2000000137  | 025503 | 00124300000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 22 |
| 0821 | 3   | 151 | 100 | 11   | 0.000 | 7.2     | 0.0 | 7.2 | 0   | 0  | 0.0 | 01  | 00 | 0 | 0 | 0 | 0 | 010 | 1122 | 0022 |   |   |      |      | 23032004 | 2000005715  | 019818 | 06106800000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 0000000 | 24 |
| 0822 | 3   | 454 | 10  |      |       |         |     |     |     |    |     |     |    |   |   |   |   |     |      |      |   |   |      |      |          |             |        |             |         |         |         |         |         |         |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN   | POS | AIM | RD/16 | FIRE TIME | R D TIM     | TKG 2ND POSN | R M   | OTHR | MSUM   | Q | A NO | HEEL | FRAME | DATE     | BN         | R      | REG         | DIV     | L  |   |     |     |   |    |
|-------|-----|-----|-------|-----------|-------------|--------------|-------|------|--------|---|------|------|-------|----------|------------|--------|-------------|---------|----|---|-----|-----|---|----|
| 0     | FSP | M   | A     | Y BUR B   | C I TO      | M R POS      | PUL   | FS   | M A D  | E | C    | F    | VZBN  | Q        | A NO       | HEEL   | FRAME       | DATE    | BN | R | REG | DIV | B | MC |
| 00834 | 3   | 252 | 100   | 11 0.000  | 0.1 0.0 0.1 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 033  | 0000 | 0022  | 22082000 | 2000004664 | 015805 | 00004500000 | 0000000 | 22 |   |     |     |   |    |
| 00835 | 3   | 333 | 100   | 11 0.000  | 0.2 0.0 0.2 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 033  | 0000 | 0022  | 23042000 | 2000004664 | 015901 | 00004500000 | 0000000 | 22 |   |     |     |   |    |
| 00836 | 3   | 353 | 100   | 11 0.000  | 0.0 0.0 0.0 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 033  | 0000 | 0022  | 23042000 | 2000004664 | 080106 | 00001500000 | 0000000 | 22 |   |     |     |   |    |
| 00837 | 3   | 151 | 100   | 52 3.000  | 0.0 0.0 0.4 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 1121 | 0022  | 23022002 | 2000004664 | 067001 | 00004500000 | 0000000 | 22 |   |     |     |   |    |
| 00838 | 3   | 353 | 100   | 11 0.000  | 0.1 0.0 0.1 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 1 | 033  | 1121 | 1222  | 23022002 | 2000004664 | 066000 | 00004500000 | 0000000 | 12 |   |     |     |   |    |
| 00839 | 3   | 454 | 100   | 51 0.000  | 0.3 0.0 0.3 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 022  | 1121 | 0022  | 11032001 | 2000000812 | 012113 | 00055100000 | 0000000 | 23 |   |     |     |   |    |
| 00840 | 3   | 353 | 100   | 51 0.000  | 0.5 0.0 0.8 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 13062000 | 2000000812 | 019105 | 00055100000 | 0000000 | 23 |   |     |     |   |    |
| 00841 | 3   | 353 | 111   | 52 4.000  | 0.5 1.6 1.2 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 010  | 0000 | 0022  | 13062000 | 2000000812 | 019414 | 00055100000 | 0000000 | 23 |   |     |     |   |    |
| 00842 | 1   | 252 | 100   | 21 0.000  | 0.6 0.0 0.6 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 1121 | 0022  | 11020002 | 2000000814 | 020810 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00843 | 1   | 454 | 111   | 52 3.200  | 0.3 1.1 0.4 | 1 2 0        | 0 0 0 | 04   | 00 0 0 | 0 | 010  | 0000 | 0022  | 11092002 | 2000000814 | 021502 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00844 | 2   | 515 | 100   | 11 0.000  | 1.2 0.0 1.4 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 031  | 1121 | 0021  | 11062001 | 2000000789 | 006807 | 17045100000 | 0000000 | 23 |   |     |     |   |    |
| 00845 | 1   | 232 | 100   | 11 0.000  | 1.0 0.0 1.0 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 031  | 1121 | 0022  | 22042001 | 2000001021 | 029008 | 23025100015 | 0010000 | 23 |   |     |     |   |    |
| 00846 | 1   | 343 | 100   | 52 5.000  | 0.3 0.0 0.6 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 4 | 033  | 0000 | 1322  | 23022000 | 2000001021 | 029314 | 23025100015 | 0010000 | 23 |   |     |     |   |    |
| 00847 | 1   | 313 | 100   | 11 0.000  | 3.9 0.0 3.9 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 11042100 | 2000001020 | 031309 | 02035100035 | 0010000 | 23 |   |     |     |   |    |
| 00848 | 1   | 751 | 200   | 11 0.000  | 0.8 0.0 0.8 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 1 | 010  | 0000 | 1122  | 11112000 | 2000001020 | 040205 | 02035100035 | 0010000 | 23 |   |     |     |   |    |
| 00849 | 1   | 353 | 111   | 11 0.000  | 1.2 1.8 1.5 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 032  | 1111 | 0022  | 11032004 | 2000001002 | 007803 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00850 | 1   | 131 | 111   | 11 0.000  | 1.5 2.1 1.9 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 031  | 0000 | 0022  | 12032000 | 2000001002 | 017406 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00851 | 1   | 131 | 190   | 11 0.000  | 4.1 0.0 4.1 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 031  | 0000 | 0012  | 13022030 | 2000001002 | 015803 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00852 | 1   | 131 | 100   | 11 0.000  | 3.5 0.0 3.5 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 031  | 0000 | 0022  | 13022000 | 2000001002 | 017406 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00853 | 1   | 131 | 111   | 11 0.000  | 1.0 2.7 1.4 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 033  | 0000 | 0022  | 13042000 | 2000001002 | 018003 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00854 | 1   | 343 | 111   | 52 3.500  | 0.9 4.0 2.5 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 033  | 1121 | 0022  | 11032002 | 2000001002 | 033814 | 00001000000 | 0000000 | 23 |   |     |     |   |    |
| 00855 | 1   | 343 | 111   | 52 3.500  | 1.0 3.6 2.3 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 033  | 1121 | 0022  | 13022002 | 2000001002 | 034612 | 00005100000 | 0000000 | 23 |   |     |     |   |    |
| 00856 | 1   | 353 | 100   | 21 0.000  | 1.3 0.0 1.3 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 13042000 | 2000000966 | 047009 | 01035100025 | 0010015 | 23 |   |     |     |   |    |
| 00857 | 1   | 252 | 111   | 11 0.000  | 0.0 1.6 0.8 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 022  | 1121 | 0022  | 12042001 | 2000000896 | 013613 | 06075100000 | 0000000 | 23 |   |     |     |   |    |
| 00858 | 1   | 151 | 100   | 11 0.000  | 0.2 0.0 0.2 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 21082000 | 2000000896 | 016702 | 06075100000 | 0000000 | 23 |   |     |     |   |    |
| 00859 | 1   | 252 | 121   | 11 0.000  | 0.9 3.0 2.3 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 023  | 0000 | 0022  | 12042000 | 2000000896 | 017707 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00860 | 1   | 252 | 111   | 11 0.000  | 0.1 1.4 0.9 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 033  | 0000 | 0022  | 13012000 | 2000000569 | 018808 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00861 | 1   | 252 | 111   | 22 4.500  | 1.4 1.7 1.5 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 023  | 0000 | 0022  | 13012000 | 2000000569 | 019307 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00862 | 1   | 252 | 111   | 52 2.000  | 1.4 0.6 1.1 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 033  | 0000 | 0022  | 23022000 | 2000000569 | 020008 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00863 | 1   | 353 | 100   | 11 0.000  | 3.0 0.0 3.0 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 032  | 1121 | 0022  | 11092001 | 2000000569 | 020701 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00864 | 1   | 616 | 100   | 11 0.000  | 2.7 0.0 2.7 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 033  | 0000 | 0022  | 12032000 | 2000000569 | 021410 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00865 | 1   | 252 | 100   | 11 0.000  | 0.5 0.0 0.5 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 023  | 0000 | 0022  | 13042000 | 2000000569 | 022814 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00866 | 1   | 414 | 111   | 11 0.000  | 1.5 3.0 2.2 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 010  | 0000 | 0022  | 11042000 | 2000000569 | 023905 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00867 | 1   | 313 | 100   | 11 0.000  | 0.3 0.0 0.3 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 021  | 1121 | 0022  | 13102001 | 2000000569 | 034000 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00868 | 1   | 313 | 100   | 11 0.000  | 0.2 1.4 0.8 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 021  | 0000 | 0022  | 12092000 | 2000000569 | 034610 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00869 | 1   | 353 | 111   | 52 6.000  | 0.0 2.5 1.3 | 1 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 033  | 0000 | 0022  | 11042000 | 2000000569 | 035114 | 23055100000 | 0010000 | 23 |   |     |     |   |    |
| 00870 | 3   | 454 | 100   | 51 0.000  | 1.5 0.0 1.5 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 12032000 | 2000000569 | 011111 | 02035100000 | 0000000 | 23 |   |     |     |   |    |
| 00871 | 3   | 353 | 111   | 51 6.000  | 0.0 3.1 1.6 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 010  | 0000 | 0022  | 13012002 | 2000000569 | 012306 | 02035100000 | 0000000 | 23 |   |     |     |   |    |
| 00872 | 3   | 353 | 111   | 51 0.000  | 0.0 1.0 0.7 | 1 0 0        | 0 0 0 | 03   | 00 0 0 | 0 | 010  | 1122 | 0022  | 12032002 | 2000000569 | 012309 | 02035100000 | 0000000 | 23 |   |     |     |   |    |
| 00873 | 3   | 454 | 100   | 11 0.000  | 0.1 0.0 0.1 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 0000 | 0022  | 11072001 | 2000000890 | 029407 | 00000000000 | 0000000 | 23 |   |     |     |   |    |
| 00874 | 3   | 151 | 100   | 11 0.000  | 1.5 0.0 1.5 | 0 1 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 1122 | 0022  | 22072001 | 2000000890 | 031201 | 00000000000 | 0000000 | 23 |   |     |     |   |    |
| 00875 | 1   | 252 | 100   | 21 0.000  | 1.8 0.0 1.8 | 0 0 0        | 0 0 0 | 04   | 00 0 0 | 0 | 010  | 0000 | 0022  | 11042201 | 2000000890 | 055114 | 00000000000 | 0000000 | 23 |   |     |     |   |    |
| 00876 | 1   | 454 | 111   | 11 0.000  | 1.2 1.2 0.9 | 1 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 010  | 1122 | 0022  | 23012000 | 2000000890 | 056603 | 00000000000 | 0000000 | 23 |   |     |     |   |    |
| 00877 | 1   | 152 | 111   | 11 0.000  | 1.5 2.3 1.0 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 010  | 0000 | 0022  | 23012000 | 2000000890 | 002709 | 00115000000 | 0000000 | 23 |   |     |     |   |    |
| 00878 | 1   | 454 | 100   | 11 0.000  | 0.0 0.0 0.0 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 0 | 022  | 0000 | 0022  | 21072000 | 2000000871 | 027809 | 00115000000 | 0000000 | 23 |   |     |     |   |    |
| 00879 | 1   | 252 | 111   | 11 0.000  | 0.2 2.0 1.1 | 1 0 0        | 0 0 0 | 02   | 00 0 0 | 0 | 010  | 1222 | 0022  | 23032001 | 2000000871 | 029401 | 00115000000 | 0000000 | 23 |   |     |     |   |    |
| 00880 | 3   | 252 | 100   | 11 0.000  | 0.6 0.0 0.6 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 2 | 010  | 0000 | 1322  | 12062000 | 1000000510 | 001203 | 03034400000 | 0000000 | 12 |   |     |     |   |    |
| 00881 | 1   | 333 | 100   | 5210.000  | 2.3 0.0 6.3 | 0 0 0        | 0 0 0 | 01   | 00 0 0 | 7 | 031  | 0000 | 1322  | 13052000 | 1000000576 | 035705 | 00014400000 | 0000000 | 11 |   |     |     |   |    |
| 00882 | 1   | 232 | 122   | 21 0.000  | 0.7 2.0 1.7 | 1 0 0        | 0 0 0 | 05   | 00 0 0 | 0 | 032  | 0000 | 0022  | 13042000 | 1000000576 | 036913 | 00014400000 | 0000000 | 11 |   |     |     |   |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | ATM | RD/16 | FIRE TIME | R C TIM | TRG 2ND POSN | R M | OTHER | MSUM | O   | A NO | REEL | FRAME | DATE | BN | B | R    | REG   | B     | MC       |            |             |            |              |         |    |
|------|-----|-----|-------|-----------|---------|--------------|-----|-------|------|-----|------|------|-------|------|----|---|------|-------|-------|----------|------------|-------------|------------|--------------|---------|----|
|      | FSP | M   | A     | T         | IST     | SUB          | ALL | H     | R    | POS | PUL  | FS   | M     | A    | D  | E | C    | F     | C     | U        | V          | R           | AN         | S            |         |    |
| 0883 | 1   | 232 | 111   | 21        | 0.000   | 1.3          | 0.9 | 1.0   | 3    | 0   | 0.0  | 0.7  | 0.0   | 0    | 0  | 0 | 0.33 | 0.000 | 0.022 | 11082000 | 1000000576 | 039410      | 0001440000 | 0000000      | 11      |    |
| 0884 | 1   | 252 | 111   | 51        | 0.000   | 2.1          | 0.7 | 0.8   | 1    | 0   | 0.0  | 1.0  | 0.0   | 0    | 0  | 0 | 0.10 | 0.000 | 0.022 | 13032000 | 1000000576 | 042607      | 0001440000 | 0000000      | 11      |    |
| 0885 | 1   | 252 | 111   | 51        | 0.000   | 1.0          | 0.5 | 0.6   | 1    | 0   | 0.0  | 1.5  | 0.0   | 0    | 0  | 0 | 0.10 | 0.000 | 0.022 | 13032000 | 1000000576 | 043903      | 0001440000 | 0000000      | 11      |    |
| 0886 | 1   | 252 | 111   | 51        | 0.000   | 1.0          | 1.0 | 1.0   | 1    | 0   | 0.0  | 0.4  | 0.0   | 0    | 0  | 0 | 0.21 | 0.000 | 0.022 | 13022000 | 1000000576 | 047905      | 0001440000 | 0000000      | 11      |    |
| 0887 | 1   | 152 | 100   | 5216.000  | 1.1     | 0.0          | 2.9 | 0     | 0    | 0.0 | 0.1  | 0.0  | 0     | 0    | 0  | 0 | 0.22 | 0.000 | 0.022 | 13032000 | 1000000576 | 048711      | 0001440000 | 0000000      | 11      |    |
| 0888 | 1   | 353 | 141   | 11        | 0.000   | 0.812        | 7.8 | 1     | 0    | 0.0 | 0.3  | 0.0  | 0     | 0    | 0  | 0 | 0.33 | 0.000 | 0.022 | 13102000 | 1000000576 | 059413      | 0001440000 | 0000000      | 11      |    |
| 0889 | 1   | 353 | 122   | 11        | 0.000   | 1.6          | 1.1 | 1.1   | 2    | 0   | 0.0  | 0.4  | 0.0   | 0    | 0  | 0 | 0.31 | 1.112 | 0.022 | 12022001 | 1000000576 | 065100      | 0001440000 | 0000000      | 11      |    |
| 0890 | 1   | 353 | 111   | 11        | 0.000   | 0.9          | 0.9 | 0.9   | 1    | 0   | 0.0  | 0.4  | 0.0   | 0    | 0  | 0 | 0.22 | 1.111 | 0.022 | 13032002 | 1000000576 | 066906      | 0001440000 | 0000000      | 11      |    |
| 0891 | 1   | 317 | 111   | 11        | 0.000   | 1.1          | 1.5 | 1.4   | 1    | 0   | 0.0  | 0.7  | 0.0   | 0    | 0  | 0 | 0.33 | 0.000 | 0.022 | 11052000 | 1000000576 | 066906      | 0001440000 | 0000000      | 11      |    |
| 0892 |     |     |       |           |         |              |     |       |      |     |      |      |       |      |    |   |      |       |       |          |            |             |            |              |         |    |
| 0893 |     |     |       |           |         |              |     |       |      |     |      |      |       |      |    |   |      |       |       |          |            |             |            |              |         |    |
| 0894 | 2   | 131 | 122   | 21        | 0.000   | 0.2          | 2.4 | 2.2   | 1    | 0   | 0.0  | 1.2  | 0.0   | 0    | 0  | 0 | 0.33 | 0.000 | 1.221 | 12032003 | 1000000689 | 000211      | 0903440000 | 1450375      | 12      |    |
| 0895 | 2   | 131 | 111   | 21        | 0.000   | 1.9          | 2.1 | 2.0   | 1    | 0   | 0.5  | 0.4  | 0.0   | 0    | 0  | 0 | 0.33 | 1.121 | 1.121 | 22052001 | 1000000689 | 007013      | 0903440000 | 1450375      | 12      |    |
| 0896 | 1   | 253 | 111   | 11        | 0.000   | 1.3          | 1.4 | 1.3   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 0.10 | 1.111 | 1.322 | 12082002 | 1000000832 | 054203      | 0000000037 | 0000000      | 11      |    |
| 0897 | 1   | 253 | 111   | 52        | 2.000   | 10.0         | 1.5 | 5.7   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 0.4  | 0.10  | 1.111 | 12072001 | 1000000832 | 059203      | 0000000037 | 0000000      | 11      |    |
| 0898 | 1   | 253 | 100   | 11        | 0.000   | 2.3          | 0.0 | 2.3   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0.32 | 0.000 | 0.022 | 12042000 | 1000000890 | 066305      | 0002440000 | 0000000      | 11      |    |
| 0899 | 1   | 253 | 111   | 11        | 0.000   | 1.0          | 3.1 | 2.8   | 1    | 0   | 0.0  | 0.6  | 0.0   | 0    | 0  | 0 | 0.31 | 0.000 | 0.022 | 12042000 | 1000000890 | 066615      | 0002440000 | 0000000      | 11      |    |
| 0900 | 1   | 353 | 111   | 11        | 0.000   | 1.0          | 1.4 | 1.3   | 1    | 0   | 0.0  | 0.6  | 0.0   | 0    | 0  | 0 | 0.10 | 0.000 | 0.022 | 12042000 | 1000000890 | 070912      | 0002440000 | 0000000      | 11      |    |
| 0901 | 3   | 253 | 100   | 11        | 0.000   | 2.6          | 3.0 | 2.6   | 0    | 2   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0.7  | 0.31  | 0.000 | 12072000 | 1000000907 | 001400      | 0002440000 | 0000000      | 11      |    |
| 0902 | 3   | 253 | 211   | 11        | 0.000   | 2.2          | 2.9 | 2.7   | 1    | 1   | 0.0  | 0.4  | 0.0   | 0    | 0  | 0 | 0.32 | 0.000 | 0.022 | 13022100 | 1000000907 | 016612      | 0002440000 | 0000000      | 11      |    |
| 0903 | 3   | 733 | 211   | 11        | 0.000   | 0.6          | 0.9 | 0.9   | 1    | 0   | 4.4  | 0.4  | 0.0   | 0    | 0  | 0 | 0.31 | 0.000 | 0.022 | 22052000 | 1000000907 | 039615      | 0002440000 | 0000000      | 11      |    |
| 0904 | 1   | 131 | 111   | 52        | 3.700   | 2.2          | 2.4 | 2.3   | 2    | 0   | 0.0  | 0.3  | 0.0   | 0    | 0  | 0 | 0.31 | 0.000 | 0.011 | 23042000 | 1000001141 | 042505      | 2505440025 | 0020000      | 11      |    |
| 0905 | 1   | 131 | 111   | 11        | 0.000   | 1.4          | 1.4 | 1.4   | 1    | 0   | 0.0  | 0.3  | 0.0   | 0    | 0  | 0 | 0.33 | 0.000 | 1.222 | 12082000 | 1000002308 | 071503      | 0709440000 | 3700925      | 11      |    |
| 0906 | 1   | 434 | 100   | 11        | 0.000   | 1.0          | 0.0 | 1.0   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0.3  | 0.31  | 1.121 | 0.011    | 22072002   | 1000002084  | 028315     | 0808440000   | 3130000 | 11 |
| 0907 | 1   | 434 | 100   | 11        | 0.000   | 1.8          | 0.0 | 1.8   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0.3  | 0.31  | 1.121 | 0.011    | 13072002   | 1000002084  | 029106     | 0808440000   | 3130000 | 11 |
| 0908 | 1   | 252 | 131   | 11        | 0.000   | 2.7          | 0.8 | 1.7   | 1    | 0   | 1.1  | 0.2  | 0.0   | 0    | 0  | 0 | 1    | 0.10  | 1.112 | 1.222    | 21052001   | 10000021957 | 041607     | 030344500044 | 0000000 | 11 |
| 0909 | 1   | 151 | 111   | 11        | 0.000   | 0.8          | 1.7 | 1.3   | 1    | 0   | 2.3  | 0.2  | 0.0   | 0    | 0  | 0 | 1    | 1.10  | 1.112 | 1.222    | 21042002   | 1000001957  | 041908     | 030344500044 | 0000000 | 11 |
| 0910 | 1   | 151 | 111   | 11        | 0.000   | 0.6          | 3.2 | 1.9   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 6    | 0.21  | 1.121 | 1.321    | 21062002   | 1000001754  | 014115     | 280444500083 | 0000203 | 11 |
| 0911 | 1   | 151 | 100   | 11        | 0.000   | 3.7          | 0.0 | 3.7   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 8    | 0.21  | 1.111 | 1.321    | 22032001   | 1000001754  | 016414     | 280444500083 | 0000203 | 11 |
| 0912 | 1   | 131 | 111   | 11        | 0.000   | 1.3          | 2.2 | 1.7   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 1    | 0.31  | 0.000 | 1.211    | 11062000   | 1000001486  | 077509     | 1906440000   | 0000795 | 11 |
| 0913 | 1   | 252 | 111   | 11        | 0.000   | 1.2          | 0.7 | 0.8   | 3    | 0   | 1.7  | 0.5  | 0.0   | 0    | 0  | 0 | 1    | 0.21  | 0.000 | 0.011    | 23082000   | 1000001486  | 081000     | 1906440000   | 0000795 | 11 |
| 0914 | 1   | 252 | 100   | 11        | 0.000   | 2.0          | 0.0 | 2.0   | 0    | 0   | 5.0  | 0.1  | 0.0   | 0    | 0  | 0 | 1    | 0.32  | 1.221 | 0.022    | 13032002   | 1000001525  | 043502     | 30044420000  | 0000000 | 12 |
| 0915 | 1   | 131 | 111   | 52        | 2.500   | 1.5          | 2.1 | 1.8   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 2    | 0.23  | 1.111 | 0.022    | 13082102   | 1000001525  | 044409     | 30044420000  | 0000000 | 12 |
| 0916 | 1   | 151 | 100   | 21        | 0.000   | 2.8          | 0.0 | 2.8   | 0    | 0   | 4.3  | 0.1  | 0.0   | 0    | 0  | 0 | 1    | 0.22  | 1.122 | 2.122    | 12032002   | 1000001525  | 049201     | 30044420000  | 0000000 | 12 |
| 0917 | 1   | 151 | 111   | 11        | 0.000   | 0.2          | 1.1 | 0.9   | 1    | 0   | 0.0  | 0.5  | 0.0   | 0    | 0  | 0 | 0    | 0.31  | 0.000 | 0.022    | 12062000   | 1000002663  | 050803     | 0000000000   | 0000000 | 12 |
| 0918 | 1   | 353 | 100   | 11        | 0.000   | 2.2          | 0.0 | 2.2   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 2    | 0.10  | 1.111 | 1.322    | 13072001   | 1000002977  | 013512     | 0011440000   | 0000000 | 12 |
| 0919 | 1   | 353 | 100   | 11        | 0.000   | 1.4          | 0.0 | 1.4   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0    | 0.19  | 1.111 | 0.022    | 13082001   | 1000002977  | 014408     | 0011440000   | 0000000 | 12 |
| 0920 |     |     |       |           |         |              |     |       |      |     |      |      |       |      |    |   |      |       |       |          |            |             |            |              |         |    |
| 0921 | 1   | 151 | 100   | 11        | 0.000   | 1.0          | 0.0 | 1.0   | 0    | 0   | 1.4  | 0.1  | 0.0   | 0    | 0  | 0 | 1    | 1.10  | 1.112 | 1.122    | 11102002   | 1000003228  | 014007     | 17014500000  | 0000000 | 12 |
| 0922 | 1   | 151 | 100   | 21        | 0.000   | 0.3          | 0.0 | 0.3   | 0    | 0   | 2.6  | 0.1  | 0.0   | 0    | 0  | 0 | 1    | 1.10  | 1.112 | 1.122    | 11102001   | 1000003228  | 014203     | 17014500000  | 0000000 | 12 |
| 0923 | 1   | 151 | 100   | 11        | 0.000   | 0.0          | 0.0 | 0.0   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 2    | 0.10  | 1.222 | 0.022    | 11092001   | 1000003333  | 015115     | 07024500030  | 1610255 | 12 |
| 0924 | 1   | 252 | 111   | 11        | 0.000   | 1.5          | 2.4 | 1.9   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 0    | 0.22  | 1.111 | 0.022    | 11042002   | 1000003333  | 015400     | 07024500030  | 1610255 | 12 |
| 0925 | 1   | 252 | 100   | 11        | 0.000   | 1.7          | 0.0 | 1.7   | 0    | 0   | 0.5  | 0.1  | 0.0   | 0    | 0  | 0 | 0    | 0.32  | 1.111 | 0.022    | 12042003   | 1000003333  | 015412     | 07024500030  | 1610255 | 12 |
| 0926 | 3   | 732 | 211   | 52        | 3.000   | 1.0          | 1.1 | 1.1   | 1    | 0   | 0.0  | 0.3  | 0.0   | 0    | 0  | 0 | 0    | 0.31  | 0.000 | 0.021    | 22052000   | 1000002176  | 020902     | 21024500000  | 1480375 | 12 |
| 0927 | 3   | 751 | 211   | 11        | 0.000   | 0.5          | 0.3 | 0.3   | 1    | 0   | 0.0  | 0.8  | 0.0   | 0    | 0  | 0 | 2    | 0.10  | 0.000 | 0.012    | 23062000   | 1000002176  | 022106     | 21024500000  | 1480375 | 12 |
| 0928 | 3   | 232 | 100   | 11        | 0.000   | 0.3          | 0.0 | 0.3   | 0    | 0   | 1.2  | 0.1  | 0.0   | 0    | 0  | 0 | 2    | 0.31  | 1.121 | 0.011    | 23082002   | 1000002176  | 023713     | 21024500000  | 1480375 | 12 |
| 0929 | 3   | 111 | 100   | 21        | 0.000   | 3.3          | 0.0 | 3.3   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 0    | 0.10  | 1.222 | 0.021    | 11032000   | 1000003723  | 039504     | 25034500000  | 0000000 | 11 |
| 0930 | 3   | 111 | 111   | 21        | 0.000   | 2.9          | 5.2 | 4.1   | 1    | 0   | 0.0  | 0.2  | 0.0   | 0    | 0  | 0 | 2    | 0.10  | 0.000 | 2.121    | 21082000   | 1000003723  | 041209     | 25034500000  | 0000000 | 11 |
| 0931 | 3   | 454 | 100   | 11        | 0.000   | 0.1          | 0.0 | 0.1   | 0    | 0   | 0.0  | 0.1  | 0.0   | 0    | 0  | 0 | 2    | 0.22  | 0.000 | 2.121    | 11082000   | 1000003723  | 045907     | 25034500000  | 0000000 | 11 |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | 0 | POS | AIM | W  | RD/16 | FIRE TIME   | R D TIM | TRG 2ND POSN | R M | OTHR MSUM | Q   | A NO | REEL | FRAME | DATE | BN B | DIV  | AO | L    |          |            |          |             |         |             |         |    |
|------|---|-----|-----|----|-------|-------------|---------|--------------|-----|-----------|-----|------|------|-------|------|------|------|----|------|----------|------------|----------|-------------|---------|-------------|---------|----|
|      |   | FSP | M   | A  | T     | 1ST SUB ALL | H R POS | PUL          | FS  | M         | A   | D    | E    | C     | F    | VZBN | AN S |    |      |          |            |          |             |         |             |         |    |
| 0932 | 3 | 235 | 111 | 11 | 0.000 | 1.1         | 4.7     | 3.5          | 3   | 0         | 4.7 | 03   | 00   | 0     | 0    | 0    | 0    | 0  | 1111 | 11042000 | 1000003481 | 022303   | 19024500000 | 0000375 | 12          |         |    |
| 0933 | 3 | 232 | 111 | 11 | 0.000 | 0.4         | 1.1     | 0.9          | 1   | 0         | 0.0 | 03   | 00   | 0     | 0    | 0    | 0    | 0  | 1111 | 13052000 | 1000003481 | 024003   | 19024500000 | 0000375 | 12          |         |    |
| 0934 | 3 | 535 | 100 | 52 | 4.000 | 0.5         | 0.0     | 1.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0011 | 21052001 | 1000003481 | 025011   | 19024500000 | 0000375 | 12          |         |    |
| 0935 | 3 | 232 | 111 | 11 | 0.000 | 1.3         | 1.6     | 1.5          | 1   | 0         | 0.0 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 0011 | 21052003 | 1000003481 | 025011   | 19024500000 | 0000375 | 12          |         |    |
| 0936 | 1 | 151 | 100 | 11 | 0.000 | 0.2         | 0.0     | 0.2          | 0   | 0         | 0.7 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 23062009 | 1000003474 | 012714   | 17024500000 | 0000115 | 12          |         |    |
| 0937 | 1 | 252 | 111 | 11 | 0.000 | 0.3         | 2.3     | 1.6          | 3   | 0         | 5.7 | 03   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 11072000 | 1000003474 | 016313   | 17024500000 | 0000115 | 12          |         |    |
| 0938 | 1 | 353 | 111 | 11 | 0.000 | 3.0         | 3.1     | 3.1          | 1   | 0         | 0.0 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 11082001 | 1000003773 | 020912   | 00004000000 | 0000000 | 12          |         |    |
| 0939 | 1 | 353 | 111 | 11 | 0.000 | 1.2         | 2.4     | 2.1          | 1   | 0         | 0.0 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 11072001 | 1000003773 | 023411   | 00004000000 | 0000000 | 12          |         |    |
| 0940 | 1 | 333 | 122 | 11 | 0.000 | 2.0         | 4.7     | 4.0          | 3   | 0         | 3.1 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 1321 | 11052001 | 1000003773 | 047607   | 00004000000 | 0000000 | 12          |         |    |
| 0941 | 1 | 333 | 111 | 11 | 0.000 | 4.0         | 3.9     | 3.9          | 1   | 0         | 1.4 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 1321 | 12062002 | 1000003773 | 047508   | 00004000000 | 0000000 | 12          |         |    |
| 0942 | 3 | 353 | 100 | 11 | 0.000 | 1.5         | 0.0     | 1.5          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 12032000 | 1000003773 | 053307   | 00004000000 | 0000000 | 12          |         |    |
| 0943 | 1 | 353 | 111 | 11 | 0.000 | 1.5         | 1.4     | 1.5          | 1   | 0         | 2.2 | 03   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 12062002 | 1000003773 | 066212   | 00004000000 | 0000000 | 12          |         |    |
| 0944 | 1 | 353 | 111 | 11 | 0.000 | 1.5         | 2.4     | 2.2          | 1   | 0         | 2.5 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 12062002 | 1000003773 | 066212   | 00004000000 | 0000000 | 12          |         |    |
| 0945 | 3 | 353 | 100 | 11 | 0.000 | 0.2         | 0.0     | 0.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 12032000 | 1000003773 | 053307   | 00004000000 | 0000000 | 12          |         |    |
| 0946 | 3 | 353 | 100 | 21 | 0.000 | 1.2         | 0.0     | 1.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 12032002 | 1000003875 | 004301   | 28034500000 | 0000073 | 11          |         |    |
| 0947 | 1 | 151 | 100 | 21 | 0.000 | 1.3         | 0.0     | 1.3          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0012 | 13052001 | 1000003875 | 004301   | 28034500000 | 0000073 | 11          |         |    |
| 0948 | 3 | 151 | 100 | 11 | 0.000 | 0.5         | 0.0     | 0.5          | 0   | 0         | 9.8 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 13052000 | 1000003934 | 022502   | 08044500000 | 0000000 | 11          |         |    |
| 0949 | 2 | 232 | 111 | 52 | 3.500 | 1.2         | 3.3     | 2.3          | 3   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 0021 | 23042000 | 1000003434 | 034504   | 09044500000 | 1370355 | 11          |         |    |
| 0950 | 1 | 232 | 121 | 11 | 0.000 | 1.826       | 8.14    | 3.3          | 1   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 1321 | 13052001 | 1000003990 | 000805   | 12044500000 | 0000000 | 11          |         |    |
| 0951 | 2 | 232 | 100 | 11 | 0.000 | 3.2         | 0.0     | 3.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0022 | 13052001 | 1000003990 | 000805   | 12044500000 | 0000000 | 11          |         |    |
| 0952 | 2 | 232 | 100 | 11 | 0.000 | 2.0         | 0.0     | 2.0          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 13062002 | 1000003990 | 005303   | 12044500000 | 0000000 | 11          |         |    |
| 0953 | 2 | 232 | 100 | 11 | 0.000 | 1.5         | 0.0     | 1.5          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 13062001 | 1000003990 | 005303   | 12044500000 | 0000000 | 11          |         |    |
| 0954 | 3 | 222 | 100 | 21 | 0.000 | 4.2         | 0.0     | 4.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 11032000 | 1000003990 | 016709   | 12044500000 | 0000000 | 11          |         |    |
| 0955 | 3 | 212 | 111 | 21 | 0.000 | 2.0         | 1.8     | 1.9          | 1   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 13052000 | 1000003990 | 016208   | 12044500000 | 0000000 | 11          |         |    |
| 0956 | 1 | 333 | 111 | 11 | 0.000 | 0.7         | 2.7     | 1.7          | 1   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 1111     | 1322       | 12032002 | 1000007315  | 025900  | 00000000000 | 3060770 | 11 |
| 0957 | 1 | 414 | 100 | 11 | 0.000 | 0.6         | 0.0     | 0.6          | 0   | 0         | 1.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1031 | 1111     | 1322       | 12032001 | 1000007315  | 026007  | 00000000000 | 3060770 | 11 |
| 0958 | 1 | 751 | 231 | 11 | 0.000 | 0.2         | 1.0     | 0.6          | 1   | 0         | 0.5 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 1110 | 1122     | 0022       | 22042002 | 1000004824  | 016604  | 00064500000 | 0000075 | 12 |
| 0959 | 1 | 151 | 111 | 11 | 0.000 | 0.3         | 2.6     | 1.5          | 1   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 1022 | 12042003 | 1000004824 | 032014   | 00064500000 | 0000075 | 12          |         |    |
| 0960 | 1 | 151 | 100 | 11 | 0.000 | 0.4         | 0.0     | 0.4          | 0   | 0         | 2.6 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1022 | 11042002 | 1000004824 | 032413   | 00064500000 | 0000075 | 12          |         |    |
| 0961 | 1 | 756 | 200 | 52 | 5.000 | 0.1         | 0.0     | 0.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1022 | 22052002 | 1000004824 | 032413   | 00064500000 | 0000075 | 12          |         |    |
| 0962 | 1 | 751 | 211 | 21 | 0.000 | 1.1         | 0.4     | 0.6          | 1   | 2         | 0.7 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 1110 | 1112     | 0022       | 21062001 | 1000004850  | 022711  | 21064500000 | 1840075 | 12 |
| 0963 | 1 | 151 | 100 | 11 | 0.000 | 0.8         | 0.0     | 0.8          | 0   | 1         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1010 | 1112     | 1222       | 11062003 | 1000004720  | 041309  | 01034500000 | 0000375 | 12 |
| 0964 | 1 | 151 | 132 | 21 | 0.000 | 0.5         | 0.5     | 0.5          | 2   | 0         | 0.0 | 03   | 00   | 2     | 2    | 1    | 0    | 0  | 1010 | 1112     | 1222       | 11042002 | 1000004720  | 041309  | 01034500000 | 0000375 | 12 |
| 0965 | 1 | 252 | 100 | 11 | 0.000 | 2.2         | 0.0     | 2.2          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1022 | 12062000 | 1000004384 | 001310   | 16044500000 | 0000665 | 12          |         |    |
| 0966 | 3 | 154 | 111 | 51 | 0.000 | 1.3         | 0.7     | 0.9          | 1   | 0         | 0.0 | 04   | 00   | 0     | 0    | 0    | 0    | 0  | 010  | 1121     | 0012       | 12062000 | 1000004158  | 021412  | 28044500000 | 3510885 | 11 |
| 0967 | 3 | 151 | 100 | 11 | 0.000 | 0.9         | 0.0     | 0.9          | 0   | 1         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0010 | 21092004 | 1000004158 | 022212   | 28044500000 | 3510885 | 11          |         |    |
| 0968 | 3 | 131 | 131 | 51 | 0.000 | 1.4         | 4.5     | 3.0          | 1   | 0         | 0.0 | 02   | 75   | 2     | 0    | 0    | 0    | 0  | 0021 | 21092001 | 1000004158 | 023410   | 28044500000 | 3510885 | 11          |         |    |
| 0969 | 3 | 232 | 100 | 11 | 0.000 | 2.2         | 0.0     | 2.2          | 0   | 1         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0031 | 21092001 | 1000004158 | 026506   | 28044500000 | 3510885 | 11          |         |    |
| 0970 | 1 | 151 | 100 | 11 | 0.000 | 0.5         | 0.0     | 0.5          | 0   | 1         | 1.2 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1010 | 23062001 | 1000002735 | 074307   | 17114400000 | 0000000 | 11          |         |    |
| 0971 | 1 | 151 | 100 | 11 | 0.000 | 0.6         | 0.0     | 0.6          | 0   | 1         | 0.3 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1010 | 22062005 | 1000002735 | 074307   | 17114400000 | 0000000 | 11          |         |    |
| 0972 | 1 | 151 | 200 | 11 | 0.000 | 0.4         | 0.0     | 0.4          | 0   | 1         | 1.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 1010 | 22062001 | 1000002735 | 074307   | 17114400000 | 0000000 | 11          |         |    |
| 0973 | 3 | 151 | 111 | 11 | 0.000 | 0.4         | 3.0     | 1.7          | 1   | 0         | 0.0 | 02   | 00   | 0     | 0    | 0    | 0    | 0  | 2010 | 22062004 | 1000002735 | 074804   | 17114400000 | 0000000 | 11          |         |    |
| 0974 | 3 | 353 | 100 | 11 | 0.000 | 1.3         | 0.0     | 1.3          | 0   | 0         | 0.0 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 2010 | 12052001 | 1000003163 | 024511   | 22064500000 | 3030795 | 11          |         |    |
| 0975 | 3 | 353 | 100 | 11 | 0.000 | 0.1         | 0.0     | 0.1          | 0   | 0         | 7.5 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 2010 | 13052002 | 1000003163 | 025700   | 22064500000 | 3030795 | 11          |         |    |
| 0976 | 3 | 252 | 111 | 11 | 0.000 | 1.2         | 1.8     | 1.7          | 1   | 0         | 0.0 | 05   | 00   | 0     | 0    | 0    | 0    | 0  | 2010 | 23062000 | 1000003163 | 031815   | 22064500000 | 3030795 | 11          |         |    |
| 0977 | 3 | 252 | 100 | 11 | 0.000 | 2.6         | 0.0     | 2.6          | 0   | 0         | 3.6 | 01   | 00   | 0     | 0    | 0    | 0    | 0  | 0021 | 21092001 | 1000003163 | 034700   | 22064500000 | 3030795 | 11          |         |    |
| 0978 | 3 | 131 | 111 | 11 | 0.000 | 3.2         | 1.6     | 2.2          | 1   | 0         | 1.0 | 03   | 00   | 0     | 0    | 0    | 0    | 0  | 0021 | 21082001 | 1000003163 | 036402   | 22064500000 | 3030795 | 11          |         |    |
| 0979 | 1 | 252 | 100 | 11 | 0.000 | 1.6         |         |              |     |           |     |      |      |       |      |      |      |    |      |          |            |          |             |         |             |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE | TIME  | H D | TIM | TRG | 2ND   | POSN | R M | OTHR | MSUM | Q | A NO | REEL | FRAME   | DATE     | BN         | B          | DIV         | AO          | L       |    |
|------|-----|-----|-------|------|-------|-----|-----|-----|-------|------|-----|------|------|---|------|------|---------|----------|------------|------------|-------------|-------------|---------|----|
|      | FSP | M   | A     | T    | 1ST   | SUB | ALL | H R | P C S | PUL  | F S | M A  | D    | E | C    | F    | V Z B N | Y R      | AN S       |            |             |             |         |    |
| 0981 | 1   | 252 | 111   | 52   | 3.000 | 3.0 | 2.8 | 2.8 | 1     | 0    | 0   | 0    | 0    | 1 | 031  | 0000 | 1211    | 11062000 | 1000003942 | 064000     | 10044500000 | 0000975     | 11      |    |
| 0982 | 1   | 252 | 100   | 11   | 0.000 | 2.0 | 0.0 | 2.0 | 0     | 0    | 0   | 0    | 0    | 1 | 031  | 0000 | 1211    | 13062000 | 1000003942 | 067407     | 10044500000 | 0000975     | 11      |    |
| 0983 | 3   | 454 | 131   | 21   | 0.000 | 2.0 | 5.2 | 3.6 | 1     | 0    | 0   | 0    | 0    | 2 | 031  | 1121 | 1311    | 11062002 | 1000003345 | 027901     | 13044500000 | 0000000     | 12      |    |
| 0984 | 3   | 151 | 100   | 11   | 0.000 | 0.7 | 0.0 | 0.7 | 0     | 0    | 0   | 0    | 0    | 0 | 010  | 1122 | 0012    | 13042002 | 1000009703 | 000213     | 06034500000 | 4151045     | 11      |    |
| 0985 | 3   | 212 | 200   | 11   | 0.000 | 1.8 | 0.0 | 1.8 | 0     | 0    | 0   | 0    | 0    | 0 | 031  | 0000 | 0011    | 23062000 | 1000009703 | 005410     | 06034500000 | 4151045     | 11      |    |
| 0986 | 1   | 252 | 100   | 11   | 0.000 | 1.2 | 0.0 | 1.2 | 0     | 1    | 1.3 | 01   | 00   | 0 | 010  | 1122 | 0022    | 21062002 | 1000004388 | 005106     | 16084500015 | 1510385     | 12      |    |
| 0987 | 1   | 454 | 111   | 11   | 0.000 | 1.9 | 4.0 | 3.0 | 1     | 0    | 0   | 0    | 0    | 3 | 010  | 1122 | 1321    | 22052005 | 1000004049 | 011600     | 19044500000 | 0000000     | 11      |    |
| 0988 | 1   | 353 | 111   | 52   | 3.700 | 0.9 | 1.3 | 1.2 | 1     | 0    | 0   | 0    | 0    | 4 | 021  | 1121 | 1322    | 11052001 | 1000009786 | 067815     | 00114300017 | 0000000     | 11      |    |
| 0989 | 1   | 373 | 111   | 11   | 0.000 | 1.0 | 4.9 | 3.6 | 1     | 0    | 0   | 0    | 0    | 4 | 032  | 0000 | 1322    | 12032000 | 1000004808 | 000215     | 07064500000 | 0000000     | 12      |    |
| 0990 | 1   | 353 | 111   | 11   | 0.000 | 1.8 | 2.8 | 2.5 | 1     | 2    | 1.9 | 03   | 00   | 4 | 010  | 0000 | 1322    | 11042000 | 1000004808 | 002913     | 07064500000 | 0000000     | 12      |    |
| 0991 | 1   | 454 | 100   | 11   | 0.000 | 0.0 | 0.0 | 0.0 | 0     | 0    | 0   | 0    | 0    | 4 | 010  | 0000 | 1322    | 12052000 | 1000004808 | 004207     | 07064500000 | 0000000     | 12      |    |
| 0992 | 1   | 353 | 211   | 11   | 0.000 | 3.2 | 3.9 | 3.7 | 1     | 2    | 0.0 | 03   | 00   | 4 | 022  | 0000 | 1322    | 12072000 | 1000004808 | 004802     | 07064500000 | 0000000     | 12      |    |
| 0993 | 1   | 353 | 111   | 11   | 0.000 | 3.2 | 3.7 | 3.5 | 1     | 0    | 0   | 01   | 00   | 0 | 010  | 0000 | 0022    | 12092000 | 1000004808 | 006815     | 07064500000 | 0000000     | 12      |    |
| 0994 |     |     |       |      |       |     |     |     |       |      |     |      |      |   |      |      |         |          |            |            |             |             |         |    |
| 0995 | 1   | 151 | 100   | 11   | 0.000 | 2.4 | 0.0 | 2.4 | 0     | 0    | 0   | 0    | 0    | 2 | 010  | 0000 | 1212    | 13072000 | 1000002208 | 007402     | 06034500000 | 0000033     | 11      |    |
| 0996 | 1   | 252 | 100   | 11   | 0.000 | 1.9 | 0.0 | 1.9 | 0     | 0    | 0   | 0    | 0    | 2 | 010  | 0000 | 1212    | 13062000 | 1000002208 | 008012     | 06034500000 | 0000033     | 11      |    |
| 0997 | 1   | 151 | 111   | 11   | 0.000 | 1.9 | 1.6 | 1.7 | 1     | 0    | 0   | 0    | 0    | 0 | 010  | 1111 | 0012    | 21082005 | 1000002208 | 018215     | 06034500000 | 0000033     | 11      |    |
| 0998 | 1   | 151 | 100   | 11   | 0.000 | 1.0 | 0.0 | 1.0 | 0     | 0    | 0   | 0    | 0    | 2 | 010  | 1112 | 1322    | 12072002 | 1000003168 | 036010     | 24014500000 | 0000000     | 11      |    |
| 0999 | 1   | 151 | 111   | 11   | 0.000 | 0.3 | 1.0 | 0.8 | 1     | 0    | 0   | 0    | 0    | 2 | 010  | 1112 | 1322    | 12072001 | 1000003168 | 036010     | 24014500000 | 0000000     | 11      |    |
| 1000 | 3   | 343 | 111   | 62   | 3.000 | 0.1 | 1.7 | 0.9 | 1     | 0    | 0   | 0    | 0    | 0 | 010  | 1111 | 0022    | 23022005 | 1000049660 | 054809     | 07026800000 | 0000000     | 14      |    |
| 1001 | 3   | 151 | 111   | 41   | 0.002 | 0.6 | 1.9 | 1.2 | 1     | 0    | 0   | 0    | 0    | 1 | 010  | 0000 | 1222    | 13062000 | 1000053410 | 040530     | 25036800000 | 0000825     | 14      |    |
| 1002 | 1   | 751 | 241   | 62   | 2.800 | 0.0 | 0.0 | 0.2 | 1     | 0    | 0   | 0    | 0    | 1 | 010  | 0000 | 1122    | 21072000 | 1000051381 | 032813     | 11056720000 | 0000255     | 14      |    |
| 1003 | 3   | 751 | 500   | 42   | 4.002 | 0.2 | 0.0 | 0.4 | 0     | 0    | 0   | 0    | 0    | 1 | 410  | 1122 | 1121    | 12032001 | 1000050865 | 010527     | 23116600000 | 0000007     | 14      |    |
| 1004 | 3   | 131 | 200   | 41   | 0.002 | 2.3 | 0.0 | 2.3 | 0     | 0    | 0   | 0    | 0    | 0 | 031  | 0000 | 0021    | 23092000 | 1000049848 | 032000     | 08046600015 | 0050255     | 14      |    |
| 1005 | 3   | 752 | 211   | 32   | 4.200 | 0.2 | 1.5 | 1.0 | 1     | 0    | 0   | 0    | 0    | 1 | 010  | 1112 | 1122    | 11032001 | 1000049848 | 036209     | 08046600015 | 0050255     | 14      |    |
| 1006 | 3   | 151 | 100   | 41   | 0.002 | 0.2 | 0.0 | 0.2 | 0     | 0    | 1.3 | 01   | 00   | 0 | 010  | 0000 | 0022    | 22072000 | 1000054137 | 071225     | 00026900000 | 0000000     | 14      |    |
| 1007 | 3   | 242 | 200   | 62   | 5.000 | 0.0 | 0.0 | 1.5 | 0     | 0    | 0   | 0    | 0    | 0 | 010  | 1121 | 0022    | 21042001 | 1000054137 | 082912     | 00026900000 | 0000000     | 14      |    |
| 1008 | 3   | 252 | 122   | 41   | 0.002 | 1.0 | 3.0 | 2.3 | 1     | 0    | 0   | 0    | 0    | 0 | 021  | 1121 | 0021    | 12031002 | 1000054515 | 041320     | 31016800000 | 0000000     | 14      |    |
| 1009 | 3   | 232 | 111   | 41   | 0.002 | 1.4 | 0.5 | 0.7 | 1     | 0    | 0   | 0    | 0    | 0 | 010  | 1121 | 0021    | 21031002 | 1000054515 | 042622     | 31016800000 | 0000000     | 14      |    |
| 1010 |     |     |       |      |       |     |     |     |       |      |     |      |      |   |      |      |         |          |            |            |             |             |         |    |
| 1011 | 1   | 756 | 200   | 42   | 7.002 | 0.0 | 0.0 | 1.9 | 0     | 2    | 0.6 | 01   | 00   | 1 | 110  | 0000 | 1122    | 21102000 | 1000051631 | 003924     | 04026720025 | 5030000     | 14      |    |
| 1012 | 1   | 756 | 641   | 41   | 0.002 | 0.2 | 0.3 | 0.3 | 1     | 0    | 0.7 | 06   | 00   | 0 | 1    | 110  | 0000    | 1322     | 22042000   | 1000051631 | 004930      | 04026720025 | 5030000 | 14 |
| 1013 | 1   | 751 | 641   | 42   | 2.802 | 0.3 | 0.5 | 0.4 | 1     | 0    | 0   | 0    | 0    | 1 | 010  | 0000 | 1322    | 21092000 | 1000051631 | 008005     | 04026720025 | 5030000     | 14      |    |
| 1014 | 3   | 353 | 100   | 41   | 0.002 | 5.0 | 0.0 | 5.0 | 0     | 0    | 0   | 0    | 0    | 2 | 031  | 1122 | 1322    | 13032001 | 1000051642 | 015028     | 20056700000 | 0000255     | 14      |    |
| 1015 | 3   | 253 | 100   | 41   | 0.002 | 1.5 | 0.0 | 1.5 | 0     | 0    | 0   | 0    | 0    | 0 | 010  | 0000 | 0022    | 12032000 | 1000051642 | 017401     | 20056700000 | 0000255     | 14      |    |
| 1016 | 3   | 454 | 111   | 41   | 0.002 | 0.8 | 1.4 | 1.1 | 1     | 0    | 0   | 0    | 0    | 0 | 010  | 0000 | 0022    | 22032000 | 1000051642 | 018106     | 20056700000 | 0000255     | 14      |    |
| 1017 | 1   | 252 | 100   | 41   | 0.002 | 0.0 | 0.0 | 0.0 | 0     | 0    | 0.1 | 01   | 00   | 1 | 010  | 1122 | 1322    | 23052001 | 1000051642 | 020321     | 20056700000 | 0000255     | 14      |    |
| 1018 | 3   | 323 | 200   | 42   | 9.012 | 0.0 | 0.0 | 2.4 | 0     | 0    | 1.0 | 01   | 00   | 1 | 310  | 1112 | 1322    | 21042001 | 1000051642 | 021821     | 20056700000 | 0000255     | 14      |    |
| 1019 | 1   | 333 | 111   | 41   | 0.002 | 0.0 | 0.6 | 0.4 | 3     | 0    | 0   | 0    | 0    | 1 | 010  | 0000 | 1322    | 21042000 | 1000051642 | 023171     | 20056700000 | 0000255     | 14      |    |
| 1020 | 1   | 757 | 241   | 41   | 0.002 | 0.2 | 1.0 | 0.6 | 1     | 0    | 0   | 0    | 0    | 1 | 010  | 1111 | 1322    | 23042001 | 1000051642 | 024334     | 20056700000 | 0000255     | 14      |    |
| 1021 | 1   | 733 | 100   | 42   | 9.012 | 0.0 | 0.0 | 0.7 | 0     | 0    | 0   | 0    | 0    | 1 | 031  | 0000 | 1322    | 13052001 | 1000051642 | 028528     | 20056700000 | 0000255     | 14      |    |
| 1022 | 1   | 252 | 142   | 41   | 0.002 | 0.3 | 2.0 | 1.4 | 2     | 0    | 2.0 | 03   | 00   | 2 | 010  | 1121 | 1322    | 12032001 | 1000051642 | 034622     | 20056700000 | 0000255     | 14      |    |
| 1023 | 1   | 252 | 111   | 41   | 0.002 | 3.7 | 1.9 | 2.5 | 1     | 0    | 0   | 0    | 0    | 2 | 010  | 1121 | 1322    | 23082001 | 1000051642 | 035010     | 20056700000 | 0000255     | 14      |    |
| 1024 | 1   | 751 | 200   | 62   | 7.000 | 1.5 | 0.0 | 2.8 | 0     | 0    | 0   | 0    | 0    | 3 | 010  | 0000 | 1322    | 11082000 | 1000052614 | 023915     | 10096700055 | 0600095     | 14      |    |
| 1025 | 1   | 151 | 200   | 62   | 5.000 | 1.0 | 0.0 | 1.2 | 0     | 0    | 0   | 0    | 0    | 3 | 010  | 0000 | 1322    | 13072000 | 1000052614 | 024710     | 10096700055 | 0600095     | 14      |    |
| 1026 | 3   | 151 | 111   | 41   | 0.002 | 3.5 | 1.1 | 1.9 | 1     | 0    | 0   | 0    | 0    | 0 | 031  | 0000 | 0022    | 21052000 | 1000052786 | 041818     | 00056820000 | 0000019     | 14      |    |
| 1027 | 3   | 151 | 111   | 41   | 0.002 | 1.5 | 1.8 | 1.8 | 1     | 0    | 0   | 0    | 0    | 0 | 010  | 0000 | 0022    | 12041000 | 1000052786 | 042311     | 00056820000 | 0000019     | 14      |    |
| 1028 | 3   | 131 | 411   | 41   | 0.002 | 0.4 | 0.5 | 0.5 | 1     | 0    | 0   | 0    | 0    | 0 | 031  | 0000 | 0022    | 22072000 | 1000052786 | 044117     | 00056820000 | 0000019     | 14      |    |
| 1029 | 3   | 515 | 100   | 42   | 4.002 | 1.3 | 0.0 | 1.8 | 0     | 0    | 0   | 0    | 0    | 1 | 010  | 0000 | 1322    | 21032000 | 1000054478 | 023216     | 01126920000 | 0000019     | 14      |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE     | TIME | R   | D   | TIM | TRG | 2ND  | POS | R   | M | OTH | MSUM | G    | A        | NO         | REEL   | FRAME       | DATE    | BN | B | R | REG | DIV | AO |
|------|-----|-----|-------|----------|------|-----|-----|-----|-----|------|-----|-----|---|-----|------|------|----------|------------|--------|-------------|---------|----|---|---|-----|-----|----|
|      |     | FSP | M     | A        | T    | 1ST | SUB | ALL | HR  | POS  | CI  | TO  |   |     |      |      |          |            |        |             |         |    |   |   |     |     |    |
| 1030 | 1   | 252 | 111   | 6211.700 | 0.0  | 0.9 | 0.6 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 1 | 010 | 0000 | 1322 | 1206200  | 1000054478 | 027921 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1031 | 1   | 252 | 111   | 41 0.002 | 0.8  | 0.7 | 0.8 | 1.0 | 0.0 | 0.2  | 0.0 | 0.0 | 1 | 021 | 1122 | 1322 | 23101003 | 1000054478 | 035727 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1032 | 1   | 252 | 100   | 41 0.002 | 1.8  | 0.0 | 1.8 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 010 | 1122 | 0012 | 11031001 | 1000054478 | 038023 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1033 | 1   | 151 | 111   | 6212.500 | 0.0  | 1.2 | 0.6 | 1.0 | 0.0 | 0.2  | 0.0 | 0.0 | 0 | 010 | 1222 | 0022 | 21022002 | 1000054478 | 038323 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1034 | 3   | 111 | 100   | 41 0.002 | 4.0  | 0.0 | 4.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0 | 031 | 1111 | 0021 | 23022010 | 1000054478 | 052513 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1035 | 3   | 111 | 100   | 41 0.002 | 2.0  | 0.0 | 2.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0 | 031 | 1111 | 0021 | 23022009 | 1000054478 | 052623 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1036 | 1   | 252 | 442   | 6215.000 | 0.6  | 5.6 | 3.9 | 1.0 | 0.5 | 0.3  | 0.0 | 0.0 | 1 | 032 | 1111 | 1322 | 11082003 | 1000054478 | 055935 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1037 | 1   | 151 | 200   | 42 6.012 | 0.8  | 0.0 | 1.0 | 1.0 | 2.4 | 0.4  | 0.0 | 0.0 | 1 | 110 | 1111 | 1322 | 11092004 | 1000054478 | 056007 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1038 | 1   | 151 | 111   | 41 0.002 | 1.8  | 0.7 | 1.0 | 1.0 | 9.9 | 0.1  | 0.0 | 0.0 | 1 | 032 | 1111 | 1322 | 11082005 | 1000054478 | 056517 | 0112692000  | 0000019 | 14 |   |   |     |     |    |
| 1039 | 1   | 555 | 100   | 41 0.002 | 2.0  | 0.0 | 2.0 | 0.0 | 0.0 | 0.0  | 0.0 | 0.0 | 0 | 010 | 1111 | 0022 | 23092004 | 1000051481 | 067620 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1040 | 3   | 754 | 241   | 41 0.002 | 1.0  | 0.5 | 0.6 | 1.1 | 0.4 | 0.3  | 0.0 | 0.0 | 0 | 010 | 1111 | 0022 | 22042002 | 1000051481 | 067832 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1041 | 3   | 252 | 111   | 41 0.002 | 0.1  | 0.7 | 0.6 | 1.1 | 0.0 | 0.4  | 0.0 | 0.0 | 0 | 010 | 1111 | 0022 | 21072003 | 1000051481 | 067738 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1042 | 3   | 252 | 111   | 41 0.002 | 3.3  | 1.2 | 1.7 | 1.1 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 010 | 1122 | 1222 | 22052001 | 1000051481 | 068413 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1043 | 3   | 252 | 100   | 41 0.002 | 0.4  | 0.0 | 0.4 | 0.1 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 010 | 1122 | 1222 | 22062001 | 1000051481 | 068533 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1044 | 3   | 252 | 100   | 41 0.002 | 0.5  | 0.0 | 0.5 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 1 | 010 | 1122 | 1222 | 22062001 | 1000051481 | 068533 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1045 | 3   | 254 | 111   | 41 0.002 | 0.3  | 0.3 | 0.3 | 1.0 | 0.0 | 0.4  | 0.0 | 0.0 | 1 | 022 | 1112 | 1322 | 21092001 | 1000051481 | 073722 | 0704672000  | 0000000 | 14 |   |   |     |     |    |
| 1046 | 3   | 252 | 132   | 42 4.702 | 0.0  | 3.8 | 2.5 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 0 | 010 | 0000 | 0022 | 12012000 | 1000052603 | 016738 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1047 | 1   | 151 | 111   | 41 0.002 | 0.9  | 1.0 | 1.0 | 1.0 | 0.0 | 0.1  | 0.0 | 0.0 | 1 | 022 | 1112 | 1322 | 22052001 | 1000052603 | 017513 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1048 | 3   | 252 | 111   | 41 0.002 | 0.6  | 0.6 | 0.6 | 1.0 | 0.0 | 0.1  | 0.0 | 0.0 | 1 | 032 | 1111 | 1322 | 23052002 | 1000052603 | 017513 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1049 | 3   | 151 | 242   | 62 6.200 | 0.7  | 1.6 | 1.6 | 1.0 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 010 | 1111 | 1322 | 21062004 | 1000052603 | 017535 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1050 | 3   | 555 | 111   | 41 0.002 | 0.6  | 0.6 | 0.6 | 1.0 | 0.0 | 0.5  | 0.0 | 0.0 | 1 | 022 | 1112 | 1322 | 22062001 | 1000052603 | 019507 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1051 | 3   | 353 | 111   | 41 0.002 | 0.4  | 0.4 | 0.4 | 1.0 | 0.0 | 0.8  | 0.0 | 0.0 | 0 | 010 | 0000 | 0022 | 12082000 | 1000052603 | 021018 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1052 | 3   | 444 | 142   | 62 6.000 | 0.6  | 4.6 | 3.3 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 0 | 033 | 1121 | 0022 | 13022001 | 1000052603 | 021418 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1053 | 3   | 353 | 100   | 41 0.001 | 1.5  | 0.0 | 1.5 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 032 | 0000 | 0022 | 13082000 | 1000052603 | 024503 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1054 | 3   | 353 | 111   | 41 0.002 | 0.3  | 0.3 | 0.3 | 1.0 | 0.0 | 0.5  | 0.0 | 0.0 | 0 | 022 | 0000 | 0022 | 12032100 | 1000052603 | 022917 | 21106720025 | 5021015 | 14 |   |   |     |     |    |
| 1055 | 1   | 232 | 111   | 41 0.002 | 1.5  | 1.6 | 1.6 | 1.0 | 0.0 | 0.6  | 0.0 | 0.0 | 1 | 031 | 1111 | 1311 | 21032100 | 1000052748 | 003515 | 06056800000 | 0000000 | 14 |   |   |     |     |    |
| 1056 | 2   | 434 | 100   | 31 0.000 | 4.2  | 0.0 | 4.2 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 13081004 | 1000054049 | 060007 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1057 | 2   | 434 | 100   | 31 0.000 | 0.6  | 0.0 | 0.6 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11081003 | 1000054049 | 060007 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1058 | 2   | 232 | 100   | 31 0.000 | 2.0  | 0.0 | 2.0 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 3 | 031 | 0000 | 1321 | 12071000 | 1000054049 | 062115 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1059 | 2   | 232 | 111   | 31 0.000 | 2.7  | 2.7 | 2.7 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 3 | 031 | 0000 | 1321 | 12071000 | 1000054049 | 062725 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1060 | 2   | 232 | 111   | 31 0.000 | 0.1  | 2.9 | 2.2 | 1.0 | 0.0 | 0.4  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11081002 | 1000054049 | 068807 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1061 | 2   | 232 | 111   | 31 0.000 | 2.2  | 6.7 | 4.5 | 1.0 | 0.0 | 0.2  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11081003 | 1000054049 | 068807 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1062 | 2   | 434 | 131   | 31 0.000 | 0.5  | 6.2 | 3.4 | 1.0 | 0.0 | 0.2  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11061001 | 1000054049 | 069913 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1063 | 2   | 515 | 100   | 31 0.000 | 3.2  | 0.0 | 3.2 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11061002 | 1000054049 | 069913 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1064 | 2   | 232 | 100   | 31 0.000 | 1.4  | 0.0 | 1.4 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 3 | 031 | 0000 | 1321 | 11091300 | 1000054049 | 070527 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1065 | 2   | 555 | 111   | 31 0.000 | 1.8  | 0.7 | 0.8 | 1.0 | 0.0 | 0.8  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 13031001 | 1000054049 | 071932 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1066 | 2   | 434 | 111   | 31 0.000 | 1.8  | 1.2 | 1.3 | 1.0 | 0.0 | 0.5  | 0.0 | 0.0 | 3 | 031 | 1111 | 1321 | 11031002 | 1000054049 | 071932 | 21026920000 | 0000000 | 14 |   |   |     |     |    |
| 1067 |     |     |       |          |      |     |     |     |     |      |     |     |   |     |      |      |          |            |        |             |         |    |   |   |     |     |    |
| 1068 |     |     |       |          |      |     |     |     |     |      |     |     |   |     |      |      |          |            |        |             |         |    |   |   |     |     |    |
| 1069 | 1   | 751 | 211   | 41 0.002 | 0.7  | 0.7 | 0.7 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 0 | 031 | 0000 | 0021 | 21092000 | 1000054753 | 065116 | 07056800000 | 0000000 | 14 |   |   |     |     |    |
| 1070 | 1   | 151 | 111   | 41 0.002 | 0.5  | 1.9 | 1.2 | 1.0 | 0.0 | 0.2  | 0.0 | 0.0 | 0 | 021 | 1111 | 0021 | 22092002 | 1000054753 | 065323 | 07056800000 | 0000000 | 14 |   |   |     |     |    |
| 1071 | 3   | 656 | 111   | 41 0.002 | 0.2  | 6.4 | 0.4 | 1.0 | 0.0 | 0.5  | 0.0 | 0.0 | 0 | 021 | 1111 | 0021 | 23092002 | 1000054753 | 066104 | 07056800000 | 0000000 | 14 |   |   |     |     |    |
| 1072 | 1   | 751 | 211   | 62 3.600 | 0.2  | 1.1 | 0.9 | 1.0 | 0.0 | 0.7  | 0.0 | 0.0 | 0 | 010 | 1221 | 0022 | 21092002 | 1000054753 | 066630 | 07056800000 | 0000000 | 14 |   |   |     |     |    |
| 1073 | 1   | 151 | 111   | 41 0.002 | 1.9  | 1.7 | 1.4 | 1.0 | 0.0 | 0.4  | 0.0 | 0.0 | 3 | 010 | 1112 | 1322 | 22092004 | 1000054773 | 038715 | 14016820025 | 0120019 | 14 |   |   |     |     |    |
| 1074 | 3   | 751 | 211   | 62 6.700 | 0.8  | 5.4 | 3.8 | 1.0 | 0.0 | 0.3  | 0.0 | 0.0 | 1 | 010 | 1121 | 1322 | 23042001 | 1000054773 | 038710 | 14016820025 | 0120019 | 14 |   |   |     |     |    |
| 1075 | 3   | 343 | 100   | 6217.000 | 0.4  | 0.0 | 5.7 | 0.0 | 0.0 | 0.1  | 0.0 | 0.0 | 0 | 032 | 1121 | 0022 | 23042001 | 1000054773 | 064226 | 14016820025 | 0120019 | 14 |   |   |     |     |    |
| 1076 | 3   | 242 | 111   | 62 2.500 | 0.1  | 1.5 | 1.2 | 1.0 | 0.0 | 0.5  | 0.0 | 0.0 | 2 | 033 | 1121 | 1322 | 23032003 | 1000054773 | 069618 | 14016820025 | 0120019 | 14 |   |   |     |     |    |
| 1077 | 3   | 242 | 111   | 62 2.500 | 0.5  | 0.9 | 0.9 | 1.0 | 0.0 | 0.10 | 0.0 | 0.0 | 2 | 033 | 1121 | 1322 | 23032002 | 1000054773 | 070237 | 14016820025 | 0120019 | 14 |   |   |     |     |    |
| 1078 | 1   | 242 | 111   | 62 3.400 | 0.0  | 1.9 | 1.6 | 1.0 | 0.0 | 0.7  | 0.0 | 0.0 | 2 | 033 | 1121 | 1322 | 22062001 | 1000054773 | 070811 | 14016820025 | 0120019 | 14 |   |   |     |     |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE TIME | R D C I | TIM | TRG  | 2ND | POSN | R M | OTHR | MSUM | O  | A NO | REEL | FRAME | DATE | BN   | R    | REG      | DIV        | B      | MC          |         |    |
|------|-----|-----|-------|-----------|---------|-----|------|-----|------|-----|------|------|----|------|------|-------|------|------|------|----------|------------|--------|-------------|---------|----|
|      |     | FSP | M     | A         | T       | 1ST | SUB  | ALL | H R  | POS | PUL  | FS   | M  | A    | D    | E     | C    | F    | VZRN | AN       | S          |        |             |         |    |
| 0079 | 3   | 751 | 641   | 62        | 2.500   | 0.8 | 2.2  | 2.1 | 1    | 2   | 0.0  | 12   | 00 | 0    | 0    | 1     | 010  | 1122 | 1322 | 22062001 | 1000053528 | 015421 | 22076820015 | 0080019 | 14 |
| 0080 | 3   | 751 | 200   | 62        | 5.000   | 1.4 | 0.0  | 1.7 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 2     | 010  | 1222 | 1322 | 21092001 | 1000052355 | 068130 | 05096720000 | 0000000 | 14 |
| 0081 | 3   | 151 | 111   | 41        | 0.002   | 0.5 | 2.6  | 1.9 | 1    | 0   | 0.0  | 03   | 00 | 0    | 0    | 0     | 022  | 1111 | 0022 | 22042008 | 1000052355 | 070710 | 05096720000 | 0000000 | 14 |
| 0082 | 3   | 151 | 100   | 41        | 0.002   | 5.5 | 0.0  | 5.5 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 022  | 1111 | 0022 | 22042007 | 1000052355 | 070710 | 05096720000 | 0000000 | 14 |
| 0083 | 3   | 151 | 111   | 41        | 0.002   | 3.8 | 0.2  | 2.0 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 0     | 022  | 1111 | 0022 | 23042004 | 1000052355 | 070710 | 05096720000 | 0000000 | 14 |
| 0084 | 3   | 454 | 100   | 31        | 0.000   | 2.6 | 0.0  | 2.6 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 1     | 010  | 1111 | 1322 | 21042001 | 1000052555 | 040307 | 31016800000 | 0000255 | 14 |
| 0085 | 3   | 151 | 111   | 31        | 0.000   | 0.6 | 10.2 | 5.4 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 3     | 010  | 1122 | 1322 | 11072003 | 1000050478 | 017518 | 01106500025 | 0160015 | 14 |
| 0086 | 1   | 756 | 241   | 31        | 0.000   | 0.0 | 1.0  | 0.5 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 0     | 021  | 1122 | 0022 | 11032002 | 1000050476 | 020433 | 01106500025 | 0160015 | 14 |
| 0087 | 1   | 751 | 211   | 62        | 5.000   | 6.2 | 2.9  | 4.6 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 0     | 032  | 1111 | 0022 | 13032002 | 1000050478 | 021323 | 01106500025 | 0160015 | 14 |
| 0088 | 1   | 751 | 211   | 62        | 7.000   | 0.0 | 2.9  | 1.5 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 0     | 022  | 1122 | 0022 | 12092001 | 1000050311 | 003605 | 21087000015 | 0610055 | 14 |
| 0089 | 3   | 151 | 211   | 62        | 7.000   | 0.0 | 4.1  | 2.1 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 0     | 022  | 0000 | 0022 | 12102000 | 1000050031 | 003813 | 21087000015 | 0610055 | 14 |
| 0090 | 3   | 151 | 211   | 41        | 0.002   | 0.0 | 1.0  | 0.5 | 1    | 1   | 1.1  | 02   | 00 | 0    | 0    | 1     | 010  | 1222 | 1222 | 12042006 | 1000056419 | 060909 | 15017120000 | 0000019 | 14 |
| 0091 | 3   | 751 | 290   | 41        | 0.002   | 1.1 | 0.0  | 1.1 | 0    | 1   | 0.0  | 01   | 00 | 0    | 0    | 1     | 010  | 1222 | 1222 | 22122003 | 1000056419 | 061437 | 15017120000 | 0000019 | 14 |
| 0092 | 3   | 751 | 611   | 62        | 4.700   | 0.0 | 1.0  | 1.5 | 1    | 0   | 0.0  | 15   | 00 | 0    | 0    | 0     | 010  | 1122 | 0012 | 11031004 | 1000055334 | 084520 | 01126900000 | 0000000 | 14 |
| 0093 | 3   | 751 | 641   | 62        | 8.300   | 0.0 | 5.4  | 3.6 | 1    | 0   | 0.0  | 03   | 00 | 0    | 0    | 3     | 022  | 1121 | 1322 | 21061002 | 1000055334 | 095403 | 01126900000 | 0000000 | 14 |
| 0094 | 1   | 751 | 611   | 62        | 3.400   | 1.5 | 0.8  | 0.9 | 1    | 0   | 0.0  | 05   | 00 | 0    | 0    | 0     | 010  | 1122 | 0022 | 21042004 | 1000055334 | 096818 | 01126900000 | 0000000 | 14 |
| 0095 | 1   | 751 | 241   | 42        | 3.002   | 0.1 | 0.5  | 0.4 | 1    | 0   | 0.0  | 04   | 00 | 0    | 0    | 1     | 110  | 1112 | 1222 | 21042002 | 2000004476 | 012122 | 08056700000 | 0000030 | 24 |
| 0096 | 1   | 751 | 200   | 42        | 6.002   | 0.5 | 2.0  | 1.6 | 1    | 0   | 0.0  | 04   | 00 | 0    | 0    | 1     | 010  | 1112 | 1222 | 21052001 | 2000004476 | 012133 | 08056700000 | 0000000 | 24 |
| 0097 | 1   | 751 | 241   | 42        | 3.002   | 0.0 | 0.0  | 0.4 | 0    | 0   | 0.0  | 04   | 00 | 0    | 0    | 1     | 010  | 1112 | 1222 | 21041001 | 2000004476 | 013800 | 08056700000 | 0000000 | 24 |
| 0098 | 1   | 151 | 141   | 41        | 0.002   | 0.6 | 0.3  | 0.4 | 1    | 0   | 5.4  | 04   | 00 | 0    | 0    | 1     | 110  | 1112 | 1222 | 21061002 | 2000004476 | 014133 | 08056700000 | 0000000 | 24 |
| 0099 | 2   | 151 | 132   | 42        | 4.002   | 1.6 | 1.2  | 1.3 | 1    | 0   | 3.4  | 03   | 00 | 0    | 0    | 3     | 023  | 1222 | 1321 | 12071002 | 2000004476 | 023108 | 08056700000 | 0000000 | 24 |
| 0100 | 1   | 252 | 100   | 62        | 4.000   | 6.5 | 0.0  | 7.0 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 022  | 1121 | 0022 | 23062001 | 2000005747 | 003107 | 20116800000 | 0000000 | 24 |
| 0101 | 3   | 751 | 211   | 62        | 5.000   | 0.1 | 4.3  | 2.2 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 3     | 010  | 1112 | 1322 | 13082001 | 2000005747 | 009315 | 20116800000 | 0000000 | 24 |
| 0102 | 3   | 751 | 211   | 62        | 7.500   | 0.0 | 2.8  | 1.4 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 3     | 010  | 1112 | 1322 | 23082001 | 2000005747 | 009605 | 20116800000 | 0000000 | 24 |
| 0103 |     |     |       |           |         |     |      |     |      |     |      |      |    |      |      |       |      |      |      |          |            |        |             |         |    |
| 0104 |     |     |       |           |         |     |      |     |      |     |      |      |    |      |      |       |      |      |      |          |            |        |             |         |    |
| 0105 | 3   | 151 | 111   | 41        | 0.002   | 0.0 | 1.6  | 1.2 | 1    | 2   | 0.0  | 04   | 00 | 0    | 0    | 1     | 010  | 1122 | 1222 | 21031004 | 2000006860 | 030337 | 18047000000 | 0000000 | 24 |
| 0106 | 1   | 151 | 111   | 41        | 0.002   | 1.9 | 0.5  | 0.6 | 3    | 2   | 3.7  | 18   | 00 | 0    | 0    | 1     | 010  | 0900 | 1222 | 11032200 | 2000006861 | 027303 | 18047000000 | 0000000 | 24 |
| 0107 | 1   | 151 | 111   | 41        | 0.002   | 3.8 | 2.6  | 2.2 | 1    | 2   | 0.0  | 02   | 00 | 0    | 0    | 1     | 010  | 0000 | 1222 | 11032000 | 2000006861 | 027917 | 16047000000 | 0000000 | 24 |
| 0108 | 3   | 655 | 100   | 31        | 0.000   | 1.3 | 0.0  | 1.3 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 3     | 021  | 0000 | 1321 | 22052000 | 2000004003 | 010934 | 08066600015 | 0010000 | 24 |
| 0109 | 1   | 343 | 111   | 62        | 4.500   | 1.2 | 1.5  | 1.5 | 1    | 0   | 0.0  | 04   | 00 | 0    | 0    | 0     | 022  | 1122 | 0022 | 13052001 | 2000004006 | 014414 | 10066600000 | 0000035 | 24 |
| 0110 | 1   | 343 | 100   | 62        | 2.000   | 0.5 | 0.0  | 0.7 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 022  | 1122 | 0022 | 13052001 | 2000004006 | 014737 | 10066600000 | 0000035 | 24 |
| 0111 | 1   | 752 | 200   | 31        | 0.000   | 0.5 | 0.0  | 0.5 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 1     | 010  | 0000 | 1122 | 11020000 | 2000004006 | 018133 | 10066600000 | 0000035 | 24 |
| 0112 | 1   | 151 | 100   | 31        | 0.000   | 0.4 | 0.0  | 0.4 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 010  | 1122 | 0022 | 11032002 | 2000004006 | 019033 | 10066600000 | 0000035 | 24 |
| 0113 | 1   | 751 | 200   | 31        | 0.000   | 2.0 | 0.0  | 2.0 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 010  | 1122 | 0022 | 11032002 | 2000004006 | 019033 | 10066600000 | 0000035 | 24 |
| 0114 | 3   | 645 | 111   | 62        | 8.500   | 3.7 | 2.5  | 3.1 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 2     | 010  | 1122 | 1222 | 23062001 | 2000004006 | 020834 | 10066600000 | 0000035 | 24 |
| 0115 | 3   | 343 | 100   | 62        | 5.000   | 0.0 | 0.0  | 0.3 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 022  | 0000 | 0022 | 13082000 | 2000004013 | 035521 | 06076600015 | 0000000 | 24 |
| 0116 | 3   | 343 | 111   | 62        | 4.300   | 0.6 | 1.0  | 0.4 | 1    | 0   | 0.0  | 04   | 00 | 0    | 0    | 0     | 022  | 0000 | 0022 | 13082000 | 2000004013 | 035521 | 06076600015 | 0000000 | 24 |
| 0117 | 3   | 712 | 211   | 31        | 0.000   | 0.5 | 1.0  | 0.7 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 5     | 031  | 0000 | 1321 | 13072000 | 2000004016 | 013422 | 10066600000 | 0000000 | 24 |
| 0118 | 3   | 242 | 100   | 62        | 6.000   | 0.1 | 0.0  | 0.5 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 5     | 031  | 0000 | 1321 | 13082000 | 2000004016 | 016505 | 10066600000 | 0000000 | 24 |
| 0119 | 3   | 242 | 111   | 62        | 5.000   | 0.0 | 1.6  | 0.8 | 1    | 0   | 0.0  | 02   | 00 | 0    | 0    | 5     | 031  | 0000 | 1321 | 13082000 | 2000004016 | 016505 | 10066600000 | 0000000 | 24 |
| 0120 | 3   | 242 | 111   | 62        | 5.700   | 0.5 | 1.2  | 1.1 | 1    | 0   | 0.0  | 07   | 00 | 0    | 0    | 5     | 031  | 0000 | 1321 | 12092000 | 2000004016 | 016810 | 10066600000 | 0000000 | 24 |
| 0121 | 3   | 111 | 111   | 31        | 0.000   | 0.9 | 2.1  | 1.7 | 1    | 0   | 0.0  | 03   | 00 | 0    | 0    | 0     | 010  | 1112 | 0022 | 11031002 | 2000004035 | 013314 | 00076600000 | 0000000 | 24 |
| 0122 | 3   | 151 | 100   | 31        | 0.000   | 1.4 | 0.0  | 1.4 | 0    | 0   | 1.6  | 01   | 00 | 0    | 0    | 0     | 010  | 1112 | 0022 | 11031001 | 2000004035 | 013413 | 00076600000 | 0000000 | 24 |
| 0123 | 3   | 151 | 100   | 31        | 0.000   | 1.8 | 0.0  | 1.8 | 0    | 0   | 2.5  | 01   | 00 | 0    | 0    | 0     | 010  | 1112 | 0022 | 11041003 | 2000004035 | 013434 | 00076600000 | 0000000 | 24 |
| 0124 | 3   | 343 | 111   | 62        | 4.000   | 2.0 | 1.8  | 1.9 | 1    | 0   | 0.0  | 03   | 00 | 0    | 0    | 0     | 031  | 1121 | 0022 | 21082101 | 2000004037 | 025304 | 05096600000 | 0000000 | 24 |
| 0125 | 3   | 343 | 100   | 62        | 5.000   | 2.9 | 0.0  | 3.5 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 0     | 031  | 1121 | 0022 | 11082101 | 2000004037 | 025722 | 05096600000 | 0000000 | 24 |
| 0126 | 3   | 343 | 100   | 62        | 7.000   | 0.0 | 0.0  | 0.4 | 0    | 0   | 0.0  | 01   | 00 | 0    | 0    | 3     | 031  | 1121 | 1322 | 12       |            |        |             |         |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | POS | AIM | RD/16 | FIRE TIME     | R D TIM       | TRG 2ND POSN | R M          | OTHR | MSUM | Q     | A NO | REEL     | FRAME      | DATE   | BN B        | DIV     | L    |
|------|-----|-----|-------|---------------|---------------|--------------|--------------|------|------|-------|------|----------|------------|--------|-------------|---------|------|
|      | FSP | M   | A     | T 1ST SUB ALL | C I TO        | M R POS      | PUL FS M A D | E C  | F    | V ZBN | V R  | AN S     |            | R      | R           | REG     | B MC |
| 1128 | 3   | 111 | 200   | 42 5.002      | 0.8 0.0 1.4 0 | 0 0 0        | 0 0 0        | 2    | 031  | 1111  | 1321 | 23042001 | 2000005260 | 015408 | 14026800000 | 0000000 | 24   |
| 1129 | 3   | 131 | 411   | 42 2.202      | 0.2 0.5 0.5 1 | 0 0 0        | 0 0 0        | 2    | 031  | 1111  | 1321 | 21061007 | 2000005260 | 015408 | 14026800000 | 0000000 | 24   |
| 1130 | 3   | 131 | 100   | 42 3.002      | 1.0 0.0 1.1 0 | 0 0 0        | 0 0 0        | 2    | 031  | 1111  | 1321 | 21071008 | 2000005260 | 015408 | 14026800000 | 0000000 | 24   |
| 1131 | 3   | 151 | 111   | 62 3.700      | 0.2 1.8 1.5 1 | 0 0 0        | 0 0 0        | 2    | 031  | 1112  | 1212 | 12061001 | 2000005260 | 016002 | 14026800000 | 0000000 | 24   |
| 1132 | 3   | 151 | 100   | 41 0.002      | 0.7 0.0 0.7 0 | 0 0 0        | 0 0 0        | 2    | 010  | 1112  | 1212 | 12081002 | 2000005260 | 016527 | 14026800000 | 0000000 | 24   |
| 1133 | 3   | 252 | 111   | 41 0.002      | 0.7 0.8 0.8 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1121  | 0012 | 11091003 | 2000005260 | 025505 | 14026800000 | 0000000 | 24   |
| 1134 | 3   | 232 | 111   | 41 0.002      | 2.6 2.7 2.7 1 | 0 0 0        | 0 0 0        | 0    | 021  | 0000  | 0012 | 21091000 | 2000005260 | 027307 | 14026800000 | 0000000 | 24   |
| 1135 | 3   | 151 | 211   | 41 0.002      | 0.2 0.4 0.3 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1111  | 0012 | 12091003 | 2000005260 | 028225 | 14026800000 | 0000000 | 24   |
| 1136 | 3   | 751 | 211   | 41 0.001      | 0.2 0.3 0.3 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1111  | 0012 | 13091001 | 2000005260 | 028227 | 14026800000 | 0000000 | 24   |
| 1137 | 3   | 641 | 111   | 62 6.500      | 0.0 1.0 0.8 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0011 | 11021003 | 2000005260 | 028903 | 14026800000 | 0000000 | 24   |
| 1138 | 3   | 151 | 111   | 41 0.002      | 1.7 2.1 2.0 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0011 | 11021001 | 2000005260 | 028903 | 14026800000 | 0000000 | 24   |
| 1139 | 3   | 646 | 111   | 62 4.000      | 0.4 1.0 0.7 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0011 | 11021001 | 2000005260 | 028903 | 14026800000 | 0000000 | 24   |
| 1140 | 3   | 151 | 100   | 41 0.001      | 1.5 0.0 1.5 0 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0011 | 11021003 | 2000005260 | 029303 | 14026800000 | 0000000 | 24   |
| 1141 | 3   | 155 | 100   | 41 0.002      | 2.4 0.0 2.4 0 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0012 | 13031001 | 2000005260 | 029303 | 14026800000 | 0000000 | 24   |
| 1142 | 3   | 242 | 111   | 62 2.500      | 0.0 1.5 1.3 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1112  | 0012 | 11081001 | 2000005260 | 029303 | 14026800000 | 0000000 | 24   |
| 1143 | 3   | 154 | 111   | 41 0.002      | 2.7 1.9 2.3 1 | 0 0 0        | 0 0 0        | 0    | 031  | 1121  | 0011 | 11081001 | 2000005274 | 011627 | 07026800000 | 0000000 | 24   |
| 1144 | 3   | 151 | 111   | 41 0.001      | 2.1 2.4 2.2 1 | 0 0 0        | 0 0 0        | 0    | 010  | 0000  | 2121 | 11071000 | 2000004965 | 032237 | 22126700000 | 0000000 | 24   |
| 1145 | 3   | 252 | 100   | 41 0.002      | 0.1 0.0 0.1 0 | 0 0 0        | 0 0 0        | 0    | 022  | 1121  | 1211 | 22071001 | 2000005216 | 016020 | 15026800000 | 0000000 | 24   |
| 1146 | 3   | 252 | 211   | 41 0.002      | 0.3 0.8 0.6 1 | 0 0 0        | 0 0 0        | 0    | 031  | 0000  | 0011 | 11071000 | 2000005216 | 017617 | 15026800000 | 0000000 | 24   |
| 1147 | 3   | 111 | 100   | 41 0.002      | 0.9 0.0 0.9 0 | 0 0 0        | 0 0 0        | 0    | 031  | 0000  | 0011 | 13081000 | 2000005216 | 026817 | 15026800000 | 0000000 | 24   |
| 1148 | 3   | 111 | 111   | 41 0.002      | 1.7 1.5 1.4 1 | 0 0 0        | 0 0 0        | 0    | 031  | 0000  | 0011 | 13071000 | 2000005216 | 027204 | 15026800000 | 0000000 | 24   |
| 1149 | 3   | 252 | 100   | 41 0.002      | 1.4 0.0 1.4 0 | 0 0 0        | 0 0 0        | 0    | 021  | 1122  | 0022 | 21071001 | 2000005235 | 024100 | 24036800000 | 0000000 | 24   |
| 1150 | 3   | 242 | 211   | 62 4.900      | 0.6 5.2 3.7 1 | 0 0 0        | 0 0 0        | 0    | 033  | 1121  | 0022 | 22061001 | 2000004410 | 010415 | 21036700000 | 0000000 | 24   |
| 1151 | 3   | 444 | 142   | 62 5.000      | 1.3 2.3 2.1 1 | 0 0 0        | 0 0 0        | 0    | 033  | 1121  | 0022 | 22071001 | 2000004410 | 011334 | 21036700000 | 0000000 | 24   |
| 1152 | 3   | 444 | 111   | 62 7.000      | 3.5 1.7 2.1 1 | 0 0 0        | 0 0 0        | 0    | 033  | 1121  | 0022 | 11081001 | 2000004410 | 012603 | 21036700000 | 0000000 | 24   |
| 1153 | 3   | 242 | 111   | 62 7.500      | 1.5 6.2 3.9 1 | 0 0 0        | 0 0 0        | 0    | 033  | 1111  | 0022 | 12061002 | 2000004410 | 014137 | 21036700000 | 0000000 | 24   |
| 1154 | 3   | 252 | 100   | 41 0.002      | 8.1 0.0 8.1 0 | 0 0 0        | 0 0 0        | 0    | 031  | 1111  | 0022 | 22032001 | 2000004805 | 001737 | 01036700000 | 0000000 | 24   |
| 1155 | 3   | 353 | 111   | 41 0.002      | 6.9 3.0 4.0 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1111  | 0022 | 23102002 | 2000004805 | 001737 | 01036700000 | 0000000 | 24   |
| 1156 | 3   | 454 | 111   | 41 0.002      | 1.2 3.7 3.2 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1111  | 0022 | 23102003 | 2000004805 | 001737 | 01036700000 | 0000000 | 24   |
| 1157 | 3   | 454 | 111   | 41 0.002      | 0.7 3.5 2.1 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1111  | 0022 | 11092003 | 2000004805 | 002803 | 01036700000 | 0000000 | 24   |
| 1158 | 3   | 353 | 100   | 41 0.002      | 2.9 0.0 2.9 0 | 0 0 0        | 0 0 0        | 0    | 010  | 1111  | 0022 | 12052002 | 2000004805 | 002803 | 01036700000 | 0000000 | 24   |
| 1159 | 3   | 353 | 111   | 41 0.002      | 1.5 4.6 3.0 1 | 0 0 0        | 0 0 0        | 0    | 031  | 1111  | 0022 | 23042001 | 2000004805 | 002803 | 01036700000 | 0000000 | 24   |
| 1160 | 3   | 353 | 100   | 41 0.002      | 0.1 0.0 0.1 0 | 0 0 0        | 0 0 0        | 0    | 010  | 0000  | 0022 | 13062000 | 2000004805 | 003137 | 01036700000 | 0000000 | 24   |
| 1161 | 3   | 353 | 111   | 41 0.002      | 0.5 3.6 2.6 1 | 0 0 0        | 0 0 0        | 0    | 010  | 0000  | 1222 | 13062000 | 2000004805 | 003504 | 01036700000 | 0000000 | 24   |
| 1162 | 3   | 454 | 111   | 41 0.002      | 1.0 4.2 3.1 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1122  | 0022 | 13032001 | 2000004805 | 004037 | 01036700000 | 0000000 | 24   |
| 1163 | 3   | 343 | 121   | 62 7.000      | 0.4 6.2 3.3 1 | 0 0 0        | 0 0 0        | 0    | 032  | 1121  | 0022 | 13101002 | 2000004429 | 037533 | 12026700000 | 0000000 | 24   |
| 1164 | 3   | 353 | 111   | 31 0.000      | 0.2 2.0 1.4 1 | 0 0 0        | 0 0 0        | 0    | 010  | 1111  | 0022 | 23071002 | 2000004421 | 037528 | 21026700015 | 0090000 | 24   |
| 1165 | 3   | 252 | 111   | 31 0.000      | 0.4 1.9 1.6 1 | 0 0 0        | 0 0 0        | 0    | 022  | 1111  | 0022 | 13041001 | 2000004421 | 037917 | 21026700015 | 0090000 | 24   |
| 1166 | 3   | 555 | 131   | 31 0.000      | 2.2 9.6 5.9 1 | 0 0 0        | 0 0 0        | 0    | 022  | 1111  | 0022 | 12092002 | 2000004421 | 039426 | 21026700015 | 0090000 | 24   |
| 1167 | 3   | 353 | 100   | 31 0.000      | 2.5 0.0 2.5 0 | 0 0 0        | 0 0 0        | 0    | 022  | 1111  | 0022 | 11092001 | 2000004421 | 039418 | 21026700015 | 0090000 | 24   |
| 1168 | 3   | 454 | 111   | 31 0.000      | 0.5 1.8 1.5 1 | 0 0 0        | 0 0 0        | 0    | 022  | 1111  | 0022 | 21091007 | 2000004421 | 039426 | 21026700015 | 0090000 | 24   |
| 1169 | 3   | 252 | 100   | 31 0.002      | 0.1 0.3 0.3 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1111  | 0022 | 23042005 | 2000004421 | 000408 | 24056700000 | 0000000 | 24   |
| 1170 | 3   | 242 | 111   | 62 6.700      | 0.4 1.0 0.8 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1111  | 0022 | 13042003 | 2000004420 | 000408 | 24056700000 | 0000000 | 24   |
| 1171 | 3   | 242 | 111   | 62 6.700      | 0.4 1.0 0.8 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1111  | 0022 | 12092001 | 2000004420 | 000408 | 24056700000 | 0000000 | 24   |
| 1172 | 3   | 242 | 111   | 62 2.500      | 0.6 0.4 0.4 1 | 0 0 0        | 0 0 0        | 0    | 021  | 1121  | 0022 | 13022001 | 2000004420 | 001604 | 24056700000 | 0000000 | 24   |
| 1173 | 3   | 242 | 111   | 62 4.800      | 2.2 1.6 1.6 1 | 0 0 0        | 0 0 0        | 0    | 021  | 0000  | 1322 | 13072000 | 2000004420 | 002813 | 24056700000 | 0000000 | 24   |
| 1174 | 3   | 713 | 200   | 41 0.002      | 0.2 0.0 0.2 0 | 0 0 0        | 0 0 0        | 0    | 031  | 1111  | 0022 | 21032002 | 2000004420 | 005428 | 24056700000 | 0000000 | 24   |
| 1175 | 3   | 753 | 211   | 41 0.002      | 1.9 1.5 1.7 1 | 0 0 0        | 0 0 0        | 0    | 031  | 1111  | 0022 | 23032001 | 2000004420 | 005327 | 24056700000 | 0000000 | 24   |
| 1176 | 3   | 222 | 111   | 41 0.002      | 1.1 1.9 1.6 1 | 0 0 0        | 0 0 0        | 0    | 031  | 1121  | 1322 | 23042001 | 2000004420 | 028334 | 24056700000 | 0000000 | 24   |

## SMALL ARMS EFFECTIVENESS DATA

| LSN 0 | POS AIM   | RD/16         | FIRE TIME       | R D TIM   | TRG 2ND POSN | R M   | OTHM MSUM | Q A NO   | VEEL       | FRAME  | DATE        | BN B    | DIV     | L    |
|-------|-----------|---------------|-----------------|-----------|--------------|-------|-----------|----------|------------|--------|-------------|---------|---------|------|
| FSP M | A         | T 1ST SUB ALL | C I TO          | M R POS   | PUL FS M A D | G E   | C U OIRA  | V R      | AN S       |        |             | R       | REG     | B MC |
| 1177  | 3 252 241 | 41 0.702      | 0.0 0.5 0.3 3 0 | 0.0 0.3 0 | 00 0 0 0     | 0 021 | 1121 0022 | 11091001 | 2000004420 | 029322 | 24056700000 | 0000000 | 0000000 | 24   |
| 1178  | 1 752 211 | 32 2.400      | 0.2 0.7 0.6 1 0 | 2.0 0.7 0 | 00 0 0 0     | 1 110 | 1112 1222 | 11031001 | 2000004350 | 020707 | 05096600036 | 0000000 | 0000000 | 24   |
| 1179  | 1 252 111 | 31 0.000      | 0.2 0.5 0.5 1 0 | 2.8 0.5 0 | 00 0 0 0     | 1 110 | 1112 1222 | 11031002 | 2000004350 | 020803 | 06096600036 | 0000000 | 0000000 | 24   |
| 1180  | 1 252 142 | 32 2.800      | 0.1 0.7 0.6 1 0 | 2.9 0.6 0 | 00 0 0 0     | 1 110 | 1112 1222 | 11031003 | 2000004350 | 020807 | 06096600036 | 0000000 | 0000000 | 24   |
| 1181  | 3 756 611 | 62 4.300      | 0.3 1.1 1.0 1 0 | 6.3 0.7 0 | 00 0 0 0     | 0 022 | 0000 0022 | 12061000 | 2000004391 | 014929 | 17046700000 | 0000000 | 0000000 | 24   |
| 1182  | 3 752 600 | 42 6.002      | 0.2 0.0 0.9 0 0 | 0.0 0.1 0 | 00 0 0 0     | 0 032 | 0000 0022 | 11031000 | 2000004391 | 015336 | 17046700000 | 0000000 | 0000000 | 24   |
| 1183  | 3 343 111 | 62 6.700      | 6.2 3.3 4.3 1 0 | 0.0 0.3 0 | 00 0 0 0     | 0 010 | 1122 0022 | 11041001 | 2000004391 | 016338 | 17046700000 | 0000000 | 0000000 | 24   |
| 1184  | 3 343 111 | 62 5.000      | 0.0 8.0 4.0 1 0 | 0.0 0.2 0 | 00 0 0 0     | 0 010 | 1122 0022 | 12051001 | 2000004391 | 037128 | 17046700000 | 0000000 | 0000000 | 24   |
| 1185  | 3 151 122 | 41 0.002      | 1.0 1.2 1.2 3 0 | 0.0 0.4 0 | 00 0 0 0     | 0 021 | 0000 0021 | 12041000 | 2000004391 | 037811 | 17046700000 | 0000000 | 0000000 | 24   |
| 1186  | 3 731 600 | 42 8.012      | 0.0 0.0 1.3 0 0 | 0.0 0.1 0 | 00 0 0 0     | 2 021 | 0000 1321 | 12061000 | 2000004391 | 039623 | 17046700000 | 0000000 | 0000000 | 24   |
| 1187  | 3 151 111 | 41 0.002      | 1.2 1.9 1.6 1 0 | 0.0 0.2 0 | 00 0 0 0     | 0 010 | 0000 0022 | 11091000 | 2000004393 | 039404 | 03056700000 | 0000000 | 0000000 | 24   |
| 1188  | 3 242 142 | 62 4.400      | 4.2 3.7 3.7 1 0 | 0.0 0.9 0 | 00 0 0 0     | 0 023 | 1121 0022 | 23051002 | 2000004393 | 042423 | 03056700000 | 0000000 | 0000000 | 24   |
| 1189  | 3 252 111 | 31 0.000      | 0.8 1.7 1.5 1 0 | 0.0 0.8 0 | 00 0 0 0     | 0 032 | 1112 0022 | 11051002 | 2000004448 | 010822 | 12046700000 | 0000000 | 0000000 | 24   |
| 1190  | 3 252 122 | 31 0.000      | 0.0 1.5 1.4 1 0 | 0.0 1.0 0 | 00 0 0 0     | 0 010 | 1111 0022 | 11051001 | 2000004448 | 010822 | 12046700000 | 0000000 | 0000000 | 24   |
| 1191  | 3 252 100 | 31 0.000      | 1.0 2.0 1.2 0 0 | 0.0 0.1 0 | 00 0 0 0     | 0 032 | 1111 0022 | 11031001 | 2000004448 | 011633 | 12046700000 | 0000000 | 0000000 | 24   |
| 1192  | 3 252 111 | 31 0.000      | 1.2 2.6 2.1 1 0 | 0.0 0.3 0 | 00 0 0 0     | 0 032 | 1111 0022 | 13032002 | 2000004448 | 011633 | 12046700000 | 0000000 | 0000000 | 24   |
| 1193  | 3 252 411 | 31 0.000      | 0.0 0.4 0.4 1 0 | 0.0 0.6 0 | 00 0 0 0     | 0 022 | 0000 0022 | 11031000 | 2000004448 | 012128 | 12046700000 | 0000000 | 0000000 | 24   |
| 1194  | 3 751 211 | 62 4.400      | 0.0 1.5 1.3 1 0 | 0.0 0.9 0 | 00 6 0 0     | 1 022 | 1121 1222 | 13091003 | 2000004448 | 029113 | 12046700000 | 0000000 | 0000000 | 24   |
| 1195  | 3 751 200 | 62 4.000      | 0.0 0.0 0.5 0 0 | 0.0 0.1 0 | 00 0 0 0     | 1 022 | 1122 1222 | 12071002 | 2000004448 | 029813 | 12046700000 | 0000000 | 0000000 | 24   |
| 1196  | 3 751 611 | 62 4.000      | 0.0 0.9 0.9 1 0 | 0.0 1.3 0 | 00 0 0 0     | 1 022 | 1122 1222 | 12031002 | 2000004448 | 033106 | 12046700000 | 0000000 | 0000000 | 24   |
| 1197  | 3 751 611 | 62 4.000      | 0.0 0.5 0.3 1 0 | 0.0 0.2 0 | 00 0 0 0     | 1 022 | 0000 1222 | 12041000 | 2000004448 | 033915 | 12046700000 | 0000000 | 0000000 | 24   |
| 1198  | 3 751 211 | 62 6.000      | 0.0 1.4 0.9 1 0 | 0.0 0.3 0 | 00 6 0 0     | 0 022 | 0000 0022 | 13041000 | 2000004448 | 034023 | 12046700000 | 0000000 | 0000000 | 24   |
| 1199  | 3 752 200 | 31 0.000      | 0.2 0.0 0.2 0 0 | 0.0 0.1 0 | 00 0 0 0     | 0 010 | 0000 0022 | 21012000 | 2000004444 | 025328 | 05026700000 | 0000000 | 0000000 | 24   |
| 1200  | 3 252 100 | 31 0.000      | 0.0 0.0 0.0 0 0 | 0.0 0.1 0 | 00 0 0 0     | 3 010 | 0000 1322 | 11052000 | 2000004444 | 025720 | 05026700000 | 0000000 | 0000000 | 24   |
| 1201  | 3 252 100 | 31 0.000      | 1.8 0.0 0.2 0 0 | 0.0 0.1 0 | 00 0 0 0     | 3 010 | 0000 1322 | 11072000 | 2000004444 | 025817 | 05026700000 | 0000000 | 0000000 | 24   |
| 1202  | 3 252 100 | 31 0.000      | 0.1 1.3 1.0 1 0 | 0.0 0.4 0 | 00 0 0 0     | 1 032 | 1122 1222 | 23031002 | 2000004363 | 030414 | 17036700000 | 0000000 | 0000000 | 24   |
| 1203  | 1 752 211 | 62 4.300      | 0.0 0.9 0.7 1 0 | 0.0 0.5 0 | 00 0 0 0     | 0 032 | 1122 1222 | 11021001 | 2000004363 | 030537 | 17036700000 | 0000000 | 0000000 | 24   |
| 1204  | 1 751 211 | 62 3.800      | 0.0 1.0 1.0 1 0 | 0.0 0.2 0 | 00 0 0 0     | 2 010 | 1112 1322 | 11031001 | 2000004363 | 030537 | 17036700000 | 0000000 | 0000000 | 24   |
| 1205  | 1 752 211 | 62 4.000      | 1.0 1.0 1.0 1 0 | 0.0 0.2 0 | 00 0 0 0     | 2 010 | 1112 1322 | 11031002 | 2000004363 | 030537 | 17036700000 | 0000000 | 0000000 | 24   |
| 1206  | 1 752 211 | 62 4.000      | 0.2 1.4 1.0 1 0 | 0.0 0.3 0 | 00 0 0 0     | 0 021 | 1112 1322 | 11091002 | 2000004367 | 029623 | 10036700000 | 0000000 | 0000000 | 24   |
| 1207  | 1 752 242 | 62 5.300      | 0.7 0.9 0.8 3 0 | 2.0 0.6 0 | 00 0 0 0     | 1 323 | 1111 0022 | 11051004 | 2000004367 | 031504 | 10036700000 | 0000000 | 0000000 | 24   |
| 1208  | 1 252 142 | 31 0.000      | 1.5 0.0 1.5 0 0 | 0.0 0.1 0 | 00 0 0 0     | 2 032 | 1121 0012 | 12061002 | 2000005244 | 031517 | 13026800000 | 0000000 | 0000000 | 24   |
| 1209  | 1 252 100 | 31 0.000      | 0.5 0.0 0.5 0 0 | 0.0 0.1 0 | 00 0 0 0     | 1 021 | 0000 1222 | 21071000 | 2000005245 | 024733 | 21026800000 | 0000000 | 0000000 | 24   |
| 1210  | 3 252 111 | 41 0.002      | 0.5 0.3 0.3 1 0 | 0.0 0.5 0 | 00 0 0 0     | 1 031 | 1121 1221 | 21061001 | 2000005245 | 025915 | 21026800000 | 0000000 | 0000000 | 24   |
| 1211  | 3 252 100 | 41 0.002      | 0.9 0.0 0.9 0 0 | 0.0 0.1 0 | 00 0 0 0     | 2 010 | 1121 1221 | 21061002 | 2000005245 | 026335 | 21026800000 | 0000000 | 0000000 | 24   |
| 1212  | 3 252 111 | 42 4.002      | 0.5 1.2 0.4 1 0 | 0.0 0.2 0 | 00 4 0 0     | 2 010 | 1121 1222 | 22061001 | 2000005245 | 026737 | 21026800000 | 0000000 | 0000000 | 24   |
| 1213  | 3 252 111 | 41 0.002      | 1.0 0.6 0.7 1 0 | 0.0 0.2 0 | 00 0 0 0     | 2 041 | 1121 1221 | 22071001 | 2000005245 | 027024 | 21026800000 | 0000000 | 0000000 | 24   |
| 1214  | 3 252 111 | 41 0.002      | 0.8 2.9 1.9 1 0 | 0.0 0.2 0 | 00 0 0 0     | 0 021 | 0000 0021 | 23071000 | 2000005245 | 027615 | 21026800000 | 0000000 | 0000000 | 24   |
| 1215  | 3 212 111 | 42 4.002      | 0.5 1.5 1.3 1 0 | 0.0 0.5 0 | 00 0 0 0     | 2 022 | 0000 1322 | 13061000 | 2000004501 | 035633 | 07036700015 | 0090035 | 0260015 | 24   |
| 1216  | 3 212 111 | 41 0.002      | 0.5 0.0 0.5 0 0 | 0.0 0.1 0 | 00 0 0 0     | 1 010 | 1122 1222 | 21081003 | 2000004523 | 000510 | 04076700000 | 0000000 | 0000000 | 24   |
| 1217  | 3 252 100 | 31 0.000      | 0.0 0.0 0.0 0 0 | 0.0 0.1 0 | 00 0 0 0     | 0 021 | 1111 0021 | 11071101 | 2000004523 | 005733 | 04076700000 | 0000000 | 0000000 | 24   |
| 1218  | 3 252 100 | 31 0.000      | 2.1 2.4 2.4 1 0 | 5.2 0.5 0 | 00 0 0 0     | 3 021 | 1111 1321 | 11061102 | 2000004523 | 005110 | 04076700000 | 0000000 | 0000000 | 24   |
| 1219  | 3 252 100 | 31 0.000      | 1.1 2.0 1.9 1 0 | 5.9 0.6 0 | 00 0 0 0     | 3 010 | 0000 1322 | 21061000 | 2000004523 | 006607 | 04076700000 | 0000000 | 0000000 | 24   |
| 1220  | 3 252 100 | 31 0.000      | 0.4 0.4 0.4 1 0 | 0.0 0.7 0 | 00 0 0 0     | 0 022 | 1121 0022 | 22032003 | 2000004524 | 028223 | 01076700035 | 0260015 | 0260015 | 24   |
| 1221  | 3 252 100 | 31 0.000      | 0.1 1.2 1.0 1 0 | 0.0 0.6 0 | 00 6 0 0     | 0 022 | 1122 0022 | 22032003 | 2000004524 | 029633 | 01076700035 | 0260015 | 0260015 | 24   |
| 1222  | 3 252 100 | 31 0.000      | 0.0 0.0 0.0 0 0 | 0.0 0.1 0 | 00 0 0 0     | 2 022 | 0000 1322 | 13061000 | 2000004501 | 035633 | 07036700015 | 0090035 | 0260015 | 24   |
| 1223  | 3 252 100 | 31 0.000      | 0.0 0.0 0.0 0 0 | 0.0 0.1 0 | 00 0 0 0     | 1 010 | 1122 1222 | 21081003 | 2000004523 | 000510 | 04076700000 | 0000000 | 0000000 | 24   |
| 1224  | 3 252 100 | 31 0.000      | 2.1 2.4 2.4 1 0 | 5.2 0.5 0 | 00 0 0 0     | 0 021 | 1111 0021 | 11071101 | 2000004523 | 005733 | 04076700000 | 0000000 | 0000000 | 24   |
| 1225  | 3 252 100 | 31 0.000      | 1.1 2.0 1.9 1 0 | 5.9 0.6 0 | 00 0 0 0     | 3 021 | 1111 1321 | 11061102 | 2000004523 | 005110 | 04076700000 | 0000000 | 0000000 | 24   |
| 1226  | 3 252 100 | 31 0.000      | 0.4 0.4 0.4 1 0 | 0.0 0.7 0 | 00 0 0 0     | 3 010 | 0000 1322 | 21061000 | 2000004523 | 006607 | 04076700000 | 0000000 | 0000000 | 24   |
| 1227  | 3 252 100 | 31 0.000      | 0.6 1.2 0.9 1 0 | 0.0 0.7 0 | 00 0 0 0     | 0 022 | 1121 0022 | 22032003 | 2000004524 | 028223 | 01076700035 | 0260015 | 0260015 | 24   |
| 1228  | 3 252 100 | 31 0.000      | 0.1 1.2 1.0 1 0 | 0.0 0.6 0 | 00 6 0 0     | 0 022 | 1122 0022 | 22032003 | 2000004524 | 029633 | 01076700035 | 0260015 | 0260015 | 24   |

| LSN  | D | POS | M   | AIM      | RDY   | BUR | FIRE | TIME | R   | O   | TIM  | TRG  | 2ND | POSN | R | M    | OTHER | MSUM | O        | A          | N          | REEL        | FRAME       | DATE    | BN | B | REG | OIV | A |    |
|------|---|-----|-----|----------|-------|-----|------|------|-----|-----|------|------|-----|------|---|------|-------|------|----------|------------|------------|-------------|-------------|---------|----|---|-----|-----|---|----|
| FSP  | M | A   | T   | IST      | SUB   | ALL | H    | R    | POS | PUL | FS   | M    | A   | U    | E | C    | F     | VZHN | AN       | S          |            |             |             |         | Q  | R | M   | REG | B | MC |
| 1226 | 3 | 454 | 100 | 41       | 0.002 | 1.9 | 0.0  | 1.9  | 0   | 0   | 0.0  | 0.1  | 00  | 0    | 0 | 0.10 | 0000  | 0022 | 11032000 | 2000004544 | 006402     | 06076700035 | 0050015     | 24      |    |   |     |     |   |    |
| 1227 |   |     |     |          |       |     |      |      |     |     |      |      |     |      |   |      |       |      |          |            |            |             |             |         |    |   |     |     |   |    |
| 1228 | 1 | 252 | 111 | 31       | 0.000 | 0.3 | 0.3  | 0.3  | 1   | 0   | 0.0  | 0.3  | 00  | 0    | 0 | 0.32 | 0200  | 0022 | 12101000 | 2000004671 | 021116     | 10036700025 | 0050015     | 24      |    |   |     |     |   |    |
| 1229 | 3 | 343 | 100 | 62       | 4.000 | 4.7 | 0.0  | 5.1  | 0   | 0   | 0.0  | 0.1  | 00  | 0    | 0 | 0.10 | 0000  | 0022 | 23041000 | 2000004671 | 021238     | 10036700025 | 0050015     | 24      |    |   |     |     |   |    |
| 1230 | 1 | 454 | 100 | 31       | 0.000 | 1.6 | 0.0  | 1.6  | 0   | 0   | 0.0  | 0.1  | 00  | 0    | 0 | 3    | 0.10  | 0000 | 1322     | 12061000   | 2000004671 | 021823      | 10036700025 | 0050015 | 24 |   |     |     |   |    |
| 1231 | 1 | 751 | 211 | 42       | 2.302 | 0.0 | 0.7  | 0.5  | 1   | 0   | 0.0  | 0.3  | 00  | 0    | 0 | 5    | 0.10  | 0000 | 1321     | 12051000   | 2000004709 | 022400      | 05036700000 | 0000000 | 24 |   |     |     |   |    |
| 1232 | 3 | 151 | 111 | 31       | 0.000 | 2.5 | 1.3  | 1.5  | 1   | 2   | 0.0  | 0.5  | 00  | 0    | 0 | 1    | 0.10  | 0000 | 0021     | 11032000   | 2000004746 | 026425      | 00106700000 | 0000000 | 24 |   |     |     |   |    |
| 1233 | 3 | 454 | 100 | 41       | 0.002 | 1.0 | 0.0  | 1.7  | 0   | 1   | 0.5  | 0.1  | 00  | 0    | 0 | 0    | 0.22  | 0000 | 0022     | 12021000   | 2000004748 | 000535      | 02036700000 | 0000035 | 24 |   |     |     |   |    |
| 1234 | 3 | 253 | 111 | 31       | 0.000 | 1.0 | 0.4  | 0.6  | 1   | 1   | 6.2  | 0.3  | 00  | 0    | 0 | 0    | 0.32  | 0000 | 0022     | 12021000   | 2000004748 | 001302      | 02036700000 | 0000035 | 24 |   |     |     |   |    |
| 1235 |   |     |     |          |       |     |      |      |     |     |      |      |     |      |   |      |       |      |          |            |            |             |             |         |    |   |     |     |   |    |
| 1236 | 3 | 252 | 132 | 41       | 0.002 | 0.0 | 4.5  | 3.4  | 3   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 0    | 0.22  | 1121 | 0022     | 22021102   | 2000004748 | 006100      | 02036700000 | 0000035 | 24 |   |     |     |   |    |
| 1237 | 1 | 151 | 111 | 41       | 0.002 | 0.4 | 0.4  | 0.4  | 1   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 0    | 0.10  | 1121 | 0021     | 23092001   | 2000006564 | 007022      | 10047000000 | 0000015 | 24 |   |     |     |   |    |
| 1238 | 3 | 131 | 411 | 62       | 6.200 | 0.5 | 2.6  | 2.3  | 1   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 1    | 0.21  | 1121 | 0021     | 23061002   | 2000004312 | 026736      | 25096600000 | 0000035 | 24 |   |     |     |   |    |
| 1239 | 3 | 353 | 100 | 61       | 0.200 | 3.5 | 0.0  | 3.5  | 0   | 0   | 0.0  | 0.1  | 00  | 0    | 0 | 1    | 0.32  | 0000 | 0022     | 13041000   | 2000004312 | 026112      | 25096600000 | 0000035 | 24 |   |     |     |   |    |
| 1240 | 3 | 353 | 411 | 62       | 3.200 | 0.0 | 0.6  | 0.4  | 1   | 0   | 0.0  | 0.3  | 00  | 0    | 0 | 1    | 0.32  | 0000 | 0022     | 23041000   | 2000004312 | 029237      | 25096600000 | 0000035 | 24 |   |     |     |   |    |
| 1241 | 3 | 141 | 611 | 62       | 5.400 | 0.0 | 1.2  | 1.1  | 1   | 0   | 0.0  | 0.7  | 00  | 0    | 0 | 1    | 0.33  | 0000 | 0022     | 23031000   | 2000004312 | 031127      | 25096600000 | 0000035 | 24 |   |     |     |   |    |
| 1242 | 3 | 131 | 611 | 62       | 2.400 | 0.9 | 1.1  | 1.1  | 1   | 0   | 0.0  | 0.2  | 00  | 0    | 0 | 1    | 0.33  | 0000 | 0022     | 23031001   | 2000004312 | 034903      | 25046600000 | 0000035 | 24 |   |     |     |   |    |
| 1243 | 3 | 252 | 611 | 62       | 3.300 | 0.2 | 1.1  | 0.8  | 1   | 0   | 0.0  | 0.3  | 00  | 0    | 0 | 1    | 0.33  | 1121 | 1322     | 23061003   | 2000004313 | 000039      | 27046600000 | 0000035 | 24 |   |     |     |   |    |
| 1244 | 3 | 232 | 611 | 62       | 3.800 | 0.0 | 1.2  | 1.0  | 1   | 0   | 0.0  | 0.6  | 00  | 0    | 0 | 1    | 0.33  | 1121 | 1322     | 23051001   | 2000004313 | 000924      | 27096600000 | 0000035 | 24 |   |     |     |   |    |
| 1245 | 3 | 212 | 111 | 31       | 0.000 | 0.4 | 0.4  | 0.5  | 1   | 0   | 0.0  | 0.6  | 00  | 0    | 0 | 0    | 0.31  | 1111 | 0022     | 23022001   | 2000004326 | 032237      | 30096600000 | 0000035 | 24 |   |     |     |   |    |
| 1246 | 3 | 212 | 132 | 31       | 0.000 | 0.1 | 0.3  | 0.3  | 2   | 0   | 0.0  | 0.8  | 00  | 0    | 0 | 0    | 0.31  | 1111 | 0022     | 22032002   | 2000004326 | 032237      | 30096600000 | 0000035 | 24 |   |     |     |   |    |
| 1247 | 3 | 555 | 111 | 41       | 0.002 | 2.7 | 1.2  | 1.7  | 1   | 0   | 1.7  | 0.3  | 00  | 0    | 0 | 0    | 0.32  | 1111 | 0022     | 12031001   | 2000005681 | 008228      | 27076700015 | 0070015 | 24 |   |     |     |   |    |
| 1248 | 3 | 252 | 111 | 41       | 0.002 | 2.2 | 1.7  | 1.8  | 1   | 0   | 2.4  | 0.9  | 00  | 0    | 0 | 0    | 0.32  | 1111 | 0022     | 13031002   | 2000005681 | 008304      | 27076700015 | 0070015 | 24 |   |     |     |   |    |
| 1249 | 3 | 252 | 111 | 41       | 0.002 | 1.0 | 1.9  | 1.7  | 1   | 0   | 0.0  | 0.5  | 00  | 0    | 0 | 0    | 0.32  | 1111 | 0022     | 12031002   | 2000005681 | 013108      | 27076700015 | 0070015 | 24 |   |     |     |   |    |
| 1250 | 3 | 357 | 111 | 41       | 0.002 | 0.0 | 0.5  | 0.4  | 1   | 0   | 0.0  | 0.9  | 00  | 0    | 0 | 0    | 0.10  | 0000 | 0022     | 22031000   | 2000005681 | 027714      | 27076700015 | 0070015 | 24 |   |     |     |   |    |
| 1251 | 3 | 454 | 111 | 41       | 0.002 | 0.4 | 0.5  | 0.5  | 1   | 0   | 0.0  | 0.9  | 00  | 0    | 0 | 0    | 0.12  | 0000 | 0022     | 13041000   | 2000005681 | 029713      | 27076700015 | 0070015 | 24 |   |     |     |   |    |
| 1252 | 3 | 343 | 111 | 62       | 6.100 | 0.4 | 0.5  | 0.5  | 1   | 0   | 0.0  | 0.7  | 00  | 0    | 0 | 0    | 0.10  | 1122 | 0022     | 23021001   | 2000005682 | 025826      | 00006800000 | 0000000 | 24 |   |     |     |   |    |
| 1253 | 3 | 347 | 111 | 62       | 5.500 | 0.6 | 1.7  | 1.6  | 1   | 0   | 0.0  | 0.9  | 00  | 4    | 0 | 0    | 0.10  | 1122 | 1322     | 13041002   | 2000005682 | 026900      | 00006800000 | 0000000 | 24 |   |     |     |   |    |
| 1254 | 3 | 111 | 111 | 41       | 0.002 | 0.0 | 1.1  | 1.0  | 1   | 0   | 0.0  | 0.9  | 00  | 0    | 0 | 2    | 0.31  | 1111 | 1321     | 22061004   | 2000005337 | 017015      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1255 | 3 | 131 | 132 | 41       | 0.002 | 2.1 | 1.9  | 1.9  | 1   | 0   | 0.0  | 0.15 | 00  | 0    | 0 | 2    | 0.31  | 1111 | 1321     | 21061002   | 2000005337 | 017015      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1256 | 3 | 131 | 111 | 42       | 3.002 | 0.3 | 1.8  | 1.5  | 3   | 0   | 0.0  | 0.3  | 00  | 0    | 0 | 2    | 0.31  | 0000 | 1321     | 21061000   | 2000005337 | 017015      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1257 | 3 | 131 | 111 | 41       | 0.002 | 1.1 | 2.7  | 2.4  | 1   | 0   | 0.0  | 0.5  | 00  | 0    | 0 | 2    | 0.31  | 1121 | 1321     | 12061002   | 2000005337 | 025622      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1258 | 3 | 131 | 111 | 41       | 0.002 | 0.1 | 0.3  | 0.3  | 1   | 0   | 20.0 | 0.6  | 00  | 0    | 0 | 2    | 0.31  | 1121 | 1321     | 12061003   | 2000005337 | 026821      | 05056800030 | 0000035 | 24 |   |     |     |   |    |
| 1259 | 3 | 111 | 100 | 42       | 9.012 | 1.6 | 0.0  | 3.2  | 0   | 0   | 0.6  | 0.1  | 00  | 0    | 0 | 0    | 0.31  | 1111 | 0021     | 23071003   | 2000005337 | 028229      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1260 | 3 | 131 | 111 | 41       | 0.001 | 5.9 | 0.5  | 1.4  | 1   | 0   | 3.6  | 0.4  | 00  | 0    | 0 | 0    | 0.31  | 1111 | 0021     | 22071001   | 2000005337 | 028422      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1261 | 3 | 131 | 100 | 41       | 0.002 | 1.4 | 0.0  | 1.8  | 0   | 0   | 2.0  | 0.1  | 00  | 0    | 0 | 0    | 0.31  | 1111 | 0021     | 23071002   | 2000005337 | 028324      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1262 | 3 | 414 | 122 | 41       | 1.812 | 1.4 | 0.7  | 0.7  | 3   | 0   | 9.5  | 0.9  | 00  | 0    | 2 | 3    | 0.10  | 1121 | 0021     | 21041005   | 2000005337 | 029613      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1263 | 3 | 414 | 111 | 41       | 0.002 | 5.5 | 6.0  | 5.7  | 1   | 0   | 5.4  | 0.2  | 00  | 0    | 0 | 3    | 0.10  | 1122 | 0021     | 21051002   | 2000005337 | 030413      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1264 | 3 | 131 | 100 | 41       | 0.002 | 4.2 | 0.0  | 4.2  | 0   | 0   | 12.6 | 0.1  | 00  | 0    | 0 | 0    | 0.31  | 0000 | 0021     | 13041000   | 2000005337 | 032010      | 05056800000 | 0000035 | 24 |   |     |     |   |    |
| 1265 | 3 | 751 | 242 | 41       | 2.502 | 0.2 | 1.2  | 1.1  | 3   | 0   | 2.1  | 0.4  | 00  | 6    | 2 | 0    | 0.10  | 1112 | 0022     | 21091003   | 2000004775 | 020114      | 02076700000 | 0000000 | 24 |   |     |     |   |    |
| 1266 | 3 | 751 | 242 | 41       | 2.202 | 1.0 | 1.1  | 1.1  | 3   | 0   | 7.5  | 0.7  | 00  | 0    | 2 | 0    | 0.10  | 1112 | 0022     | 21042001   | 2000004775 | 020338      | 02076700000 | 0000000 | 24 |   |     |     |   |    |
| 1267 | 3 | 751 | 200 | 41       | 0.002 | 0.0 | 0.0  | 0.0  | 0   | 0   | 0.5  | 0.1  | 00  | 0    | 0 | 0    | 0.10  | 1112 | 0022     | 22091002   | 2000004775 | 020517      | 02076700000 | 0000000 | 24 |   |     |     |   |    |
| 1268 | 3 | 141 | 111 | 62       | 5.000 | 0.0 | 2.2  | 1.7  | 1   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 4    | 0.31  | 1121 | 0021     | 21071002   | 2000005236 | 005103      | 24036400000 | 0000000 | 24 |   |     |     |   |    |
| 1269 | 3 | 141 | 111 | 62       | 6.800 | 0.0 | 3.3  | 2.5  | 1   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 4    | 0.31  | 1122 | 0021     | 22061004   | 2000005236 | 005103      | 24036400000 | 0000000 | 24 |   |     |     |   |    |
| 1270 | 3 | 141 | 111 | 62       | 8.500 | 0.0 | 3.4  | 2.6  | 1   | 0   | 0.0  | 0.4  | 00  | 0    | 0 | 4    | 0.31  | 1121 | 0021     | 23021002   | 2000005236 | 005103      | 24036400000 | 0000000 | 24 |   |     |     |   |    |
| 1271 | 3 | 141 | 111 | 62       | 0.000 | 0.0 | 3.6  | 1.8  | 1   | 0   | 0.0  | 0.2  | 00  | 0    | 0 | 4    | 0.31  | 1121 | 0021     | 23021002   | 2000005236 | 005103      | 24036400000 | 0000000 | 24 |   |     |     |   |    |
| 1272 | 3 | 252 | 100 | 41       | 0.002 | 2.3 | 0.0  | 2.3  | 0   | 0   | 0.0  | 0.1  | 00  | 0    | 0 | 4    | 0.31  | 0000 | 1322     | 13051002   | 2000005430 | 008912      | 24036400000 | 0000000 | 24 |   |     |     |   |    |
| 1273 | 1 | 752 | 642 | 6210.500 | 0.0   | 3.0 | 2.2  | 2.2  | 0   | 0.7 | 0.4  | 00   | 0   | 0    | 2 | 2.10 | 0000  | 1322 | 21051000 | 2000005430 | 018337     | 26056800035 | 0090035     | 24      |    |   |     |     |   |    |
| 1274 | 1 | 151 | 211 | 41       | 0.002 | 0.3 | 2.2  | 1.6  | 1   | 0   | 0.0  | 0.3  | 00  | 1    | 0 | 1    | 0.10  | 1222 | 1222     | 21041001   | 2000005430 | 038002      | 26056800035 | 0090035 | 24 |   |     |     |   |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN  | 0 | POS | ATM | RD/16 | FIRE TIME | R D TIM          | TRG 2ND POSN | R M      | OTHR MSUM | Q    | A NO | WEEL     | FRAME      | DATE   | BN B       | DIV     | L  |
|------|---|-----|-----|-------|-----------|------------------|--------------|----------|-----------|------|------|----------|------------|--------|------------|---------|----|
|      |   | FSP | M   | A     | T         | 1ST SUB ALL      | H R POS      | E        | C U       | V    | R    |          |            | R      | R          | B       | MC |
| 1275 | 3 | 111 | 100 | 41    | 0.002     | 1.9 0.0 1.9 0 0  | 1.7 01       | 0 0 0 0  | 0 131     | 1221 | 0021 | 22051001 | 2000005701 | 020633 | 1303680000 | 0000035 | 24 |
| 1276 | 3 | 111 | 100 | 41    | 0.002     | 2.8 0.0 2.8 0 0  | 0.0 01       | 0 0 0 0  | 0 031     | 0000 | 0021 | 11041000 | 2000005701 | 021026 | 1303680000 | 0000035 | 24 |
| 1277 | 3 | 131 | 100 | 31    | 0.000     | 2.2 0.0 2.2 0 0  | 0.0 01       | 0 0 0 0  | 0 031     | 1121 | 0021 | 11091001 | 2000005504 | 026304 | 0002680000 | 0000000 | 24 |
| 1278 | 3 | 131 | 100 | 31    | 0.000     | 0.8 0.0 0.8 0 0  | 0.0 01       | 0 0 0 0  | 0 031     | 0000 | 0021 | 13091001 | 2000005504 | 026533 | 0002680000 | 0000000 | 24 |
| 1279 | 3 | 131 | 100 | 31    | 0.000     | 3.2 0.0 3.2 0 0  | 0.0 01       | 0 0 0 0  | 6 031     | 0000 | 0021 | 13081000 | 2000005504 | 024038 | 0002680000 | 0000000 | 24 |
| 1280 | 1 | 252 | 111 | 41    | 0.002     | 0.5 0.5 0.5 1 0  | 0.0 01       | 0 0 0 0  | 0 010     | 0000 | 0012 | 13081000 | 2000005544 | 040503 | 1809680000 | 0070015 | 24 |
| 1281 | 1 | 752 | 600 | 62    | 4.000     | 1.1 0.0 1.4 0 0  | 0.0 01       | 0 0 0 0  | 2 022     | 1122 | 1322 | 13091001 | 2000005544 | 040837 | 1809680000 | 0070015 | 24 |
| 1282 | 3 | 454 | 111 | 41    | 0.002     | 0.8 1.5 1.4 1 0  | 0.0 09       | 0 0 0 0  | 0 032     | 1111 | 0022 | 13081000 | 2000005544 | 041027 | 1809680000 | 0070015 | 24 |
| 1283 | 3 | 252 | 111 | 41    | 0.002     | 3.5 1.2 1.5 1 0  | 0.0 09       | 0 0 0 0  | 0 023     | 1111 | 0022 | 13091004 | 2000005544 | 041027 | 1809680000 | 0070015 | 24 |
| 1284 | 3 | 252 | 111 | 41    | 0.002     | 1.2 0.7 0.8 1 0  | 0.0 12       | 0 0 0 0  | 0 022     | 1111 | 0022 | 13091004 | 2000005544 | 041830 | 1809680000 | 0070015 | 24 |
| 1285 | 3 | 454 | 132 | 41    | 0.002     | 0.5 1.3 1.2 1 0  | 0.0 07       | 0 0 0 0  | 0 032     | 1111 | 0022 | 13081003 | 2000005544 | 041830 | 1809680000 | 0070015 | 24 |
| 1286 | 3 | 752 | 642 | 62    | 5.200     | 1.4 2.0 1.9 1 0  | 0.0 05       | 20 0 0 0 | 0 010     | 1111 | 0022 | 23081004 | 2000005544 | 043004 | 1809680000 | 0070015 | 24 |
| 1287 | 3 | 252 | 111 | 62    | 4.700     | 0.0 1.4 1.0 1 0  | 0.0 03       | 0 0 0 0  | 0 010     | 0000 | 0022 | 13091000 | 2000005544 | 043534 | 1809680000 | 0070015 | 24 |
| 1288 | 3 | 252 | 611 | 62    | 4.800     | 0.6 1.1 1.0 1 0  | 0.0 05       | 0 0 0 0  | 0 022     | 1121 | 0022 | 22031002 | 2000005544 | 044303 | 1809680000 | 0070015 | 24 |
| 1289 | 3 | 151 | 111 | 41    | 0.002     | 0.5 1.0 0.8 1 0  | 0.0 02       | 0 0 0 0  | 0 031     | 0000 | 0011 | 12091000 | 2000006364 | 004928 | 0000680000 | 0000000 | 24 |
| 1290 | 1 | 252 | 600 | 626   | 6.000     | 0.0 0.0 2.8 0 0  | 0.0 01       | 0 0 0 0  | 4 010     | 0000 | 1322 | 12051000 | 2000006686 | 031117 | 2005700000 | 0050015 | 24 |
| 1291 | 3 | 353 | 111 | 11    | 0.000     | 11.7 2.5 7.1 1 0 | 0.0 02       | 0 0 0 0  | 3 031     | 0000 | 0022 | 13062000 | 2000002523 | 000001 | 0806450000 | 0290065 | 22 |
| 1292 | 1 | 333 | 100 | 11    | 0.000     | 0.0 0.0 0.0 0 0  | 0.0 01       | 0 0 0 0  | 0 031     | 0000 | 0022 | 11002100 | 2000002523 | 015417 | 0806450000 | 0290065 | 22 |
| 1293 | 1 | 151 | 100 | 52    | 4.000     | 0.3 0.0 0.8 0 0  | 0.0 01       | 0 0 0 0  | 0 010     | 1112 | 0022 | 12032002 | 2000002523 | 019220 | 0806450000 | 0290065 | 22 |
| 1294 | 1 | 151 | 111 | 11    | 0.000     | 2.0 2.0 2.0 1 0  | 11.9 02      | 0 0 0 0  | 0 010     | 1122 | 0022 | 12032002 | 2000002523 | 019926 | 0806450000 | 0290065 | 22 |
| 1295 | 1 | 212 | 160 | 11    | 0.000     | 3.2 0.0 3.2 0 0  | 0.0 01       | 0 0 0 0  | 0 031     | 0000 | 0022 | 12092000 | 2000002523 | 022805 | 0806450000 | 0290065 | 22 |
| 1297 |   |     |     |       |           |                  |              |          |           |      |      |          |            |        |            |         |    |
| 1298 |   |     |     |       |           |                  |              |          |           |      |      |          |            |        |            |         |    |
| 1299 |   |     |     |       |           |                  |              |          |           |      |      |          |            |        |            |         |    |
| 1300 | 1 | 151 | 411 | 41    | 0.002     | 0.2 1.4 1.0 1 0  | 0.0 03       | 0 0 0 0  | 0 022     | 1121 | 0022 | 12031002 | 2000005792 | 007919 | 2311680000 | 0070015 | 24 |
| 1301 | 3 | 151 | 132 | 41    | 0.002     | 0.5 2.8 2.5 1 0  | 0.0 07       | 0 0 0 0  | 0 022     | 0000 | 0022 | 12031000 | 2000005792 | 008626 | 2311680000 | 0070015 | 24 |
| 1302 | 1 | 751 | 200 | 41    | 0.002     | 0.0 0.0 0.0 0 0  | 0.6 01       | 0 0 0 0  | 1 122     | 0000 | 1222 | 12071000 | 2000005792 | 010118 | 2311680000 | 0070015 | 24 |
| 1303 | 1 | 151 | 111 | 02    | 5.100     | 0.1 1.1 0.9 1 0  | 0.0 07       | 0 0 0 0  | 1 022     | 1121 | 1322 | 22031002 | 2000005792 | 010203 | 2311680000 | 0070015 | 24 |
| 1304 | 3 | 751 | 241 | 41    | 0.002     | 2.4 2.5 2.5 1 0  | 0.0 03       | 0 0 0 0  | 2 010     | 1122 | 0022 | 21041004 | 2000005792 | 011212 | 2311680000 | 0070015 | 24 |
| 1305 | 3 | 151 | 400 | 02    | 7.000     | 0.2 0.0 1.0 0 0  | 0.0 01       | 0 0 0 0  | 1 010     | 0000 | 1322 | 13061000 | 2000005792 | 012602 | 2311680000 | 0070015 | 24 |
| 1306 | 3 | 752 | 211 | 41    | 0.002     | 0.9 0.9 0.9 1 0  | 0.0 02       | 0 0 0 0  | 0 022     | 1111 | 0022 | 23082002 | 2000005792 | 014023 | 2311680000 | 0070015 | 24 |
| 1307 | 3 | 252 | 111 | 62    | 4.700     | 0.0 1.2 0.8 1 0  | 0.0 03       | 0 0 0 0  | 2 010     | 0000 | 0022 | 11081000 | 2000004409 | 022235 | 2103670000 | 0000015 | 24 |
| 1308 | 1 | 252 | 100 | 31    | 0.000     | 0.2 0.0 0.2 0 0  | 0.0 01       | 0 0 0 0  | 2 010     | 1122 | 0022 | 21051003 | 2000004409 | 022525 | 2103670000 | 0000015 | 24 |
| 1309 | 1 | 252 | 100 | 31    | 0.000     | 1.9 0.0 1.9 0 0  | 0.0 01       | 0 0 0 0  | 2 010     | 1122 | 0022 | 21051003 | 2000004409 | 022709 | 2103670000 | 0000015 | 24 |
| 1310 | 3 | 252 | 100 | 31    | 0.000     | 1.9 0.0 1.9 0 0  | 0.0 01       | 0 0 0 0  | 2 010     | 1122 | 0022 | 21051003 | 2000004409 | 022709 | 2103670000 | 0000015 | 24 |
| 1311 | 3 | 252 | 111 | 31    | 0.000     | 4.1 3.2 3.5 1 0  | 0.0 03       | 0 0 0 0  | 2 010     | 1112 | 1222 | 21061005 | 2000004409 | 023301 | 2103670000 | 0000015 | 24 |
| 1312 | 1 | 731 | 600 | 6215  | 0.000     | 0.4 0.0 2.2 0 0  | 2.4 01       | 0 0 0 0  | 3 031     | 0000 | 0022 | 12051100 | 2000004409 | 035832 | 2103670000 | 0000015 | 24 |
| 1313 | 3 | 353 | 111 | 31    | 0.000     | 1.2 3.8 3.2 1 0  | 0.4 04       | 0 0 0 0  | 0 010     | 1111 | 0022 | 12051100 | 2000004409 | 036300 | 2103670000 | 0000015 | 24 |
| 1314 | 3 | 252 | 100 | 31    | 0.000     | 1.0 0.0 1.0 0 0  | 10.9 01      | 0 0 0 0  | 0 031     | 1111 | 0022 | 23031001 | 2000004409 | 036912 | 2103670000 | 0000015 | 24 |
| 1315 | 3 | 353 | 111 | 31    | 0.000     | 1.1 0.9 0.9 1 0  | 0.2 03       | 0 0 0 0  | 0 031     | 1111 | 0022 | 21031104 | 2000004409 | 037110 | 2103670000 | 0000015 | 24 |
| 1316 | 3 | 252 | 411 | 31    | 0.000     | 0.8 0.9 0.8 1 0  | 0.0 05       | 0 0 0 0  | 0 021     | 1111 | 0022 | 22031002 | 2000004409 | 037104 | 2103670000 | 0000015 | 24 |
| 1317 | 3 | 333 | 111 | 31    | 0.000     | 0.6 1.2 0.9 1 0  | 0.0 02       | 0 0 0 0  | 0 031     | 1111 | 0022 | 23031001 | 2000004409 | 037104 | 2103670000 | 0000015 | 24 |
| 1318 | 3 | 454 | 100 | 41    | 0.002     | 0.3 0.0 0.3 0 0  | 0.0 01       | 0 0 0 0  | 0 021     | 1112 | 0022 | 12041003 | 2000005858 | 000817 | 0703690000 | 0050015 | 24 |
| 1319 | 3 | 343 | 111 | 62    | 4.500     | 0.4 1.4 1.1 1 0  | 0.0 04       | 0 0 0 0  | 0 021     | 1111 | 0022 | 13041002 | 2000005858 | 000817 | 0703690000 | 0050015 | 24 |
| 1320 | 1 | 151 | 111 | 41    | 0.002     | 1.0 0.0 0.6 1 0  | 0.2 03       | 0 0 0 0  | 1 033     | 1111 | 0022 | 21051602 | 2000005860 | 025705 | 1403690000 | 0010015 | 24 |
| 1321 | 1 | 151 | 141 | 41    | 0.002     | 0.3 3.6 2.5 1 2  | 0.0 03       | 0 0 0 0  | 0 022     | 1121 | 0022 | 22041002 | 2000005860 | 026300 | 1403690000 | 0010015 | 24 |
| 1322 | 1 | 751 | 242 | 11    | 0.000     | 0.0 2.4 1.9 1 0  | 0.0 05       | 10 1 0 0 | 0 110     | 1122 | 0022 | 21112004 | 2000000500 | 015716 | 1506440000 | 0000045 | 22 |
| 1323 | 1 | 251 | 141 | 11    | 0.000     | 2.7 1.2 2.0 1 0  | 4.0 12       | 10 2 0 0 | 0 010     | 1111 | 0022 | 21032001 | 2000000500 | 016013 | 1506440000 | 0000045 | 22 |

## SHALL ARMS EFFECTIVENESS DATA

| LSN  | POS | FSP | M   | A  | RD/16 | FIRE TIME      | H D TIM   | TRG 2ND POSN | R M   | OTHM MSUM | Q        | A NO       | REEL   | FRAME       | DATE    | BN B | DIV | AO |
|------|-----|-----|-----|----|-------|----------------|-----------|--------------|-------|-----------|----------|------------|--------|-------------|---------|------|-----|----|
|      |     |     |     |    |       |                |           |              |       |           |          |            |        |             |         |      |     |    |
| 1324 | 1   | 151 | 100 | 11 | 0.000 | 4.7 0.0 4.7 0  | 1 0.0 01  | 00 5 0 0     | 0 010 | 1111 0022 | 21022002 | 2000000500 | 017737 | 15064400000 | 0000045 | 22   |     |    |
| 1325 | 1   | 151 | 111 | 11 | 0.000 | 0.5 0.8 0.7 1  | 2 0.0 04  | 00 0 0 0     | 1 010 | 0000 1222 | 21062000 | 2000000501 | 027832 | 15064500000 | 0000000 | 22   |     |    |
| 1326 | 1   | 751 | 200 | 11 | 0.000 | 0.0 0.0 0.0 0  | 0 0.6 01  | 00 0 0 0     | 2 110 | 0000 0022 | 21072000 | 2000000519 | 000709 | 07064400000 | 0000045 | 22   |     |    |
| 1327 | 1   | 757 | 200 | 21 | 0.000 | 0.0 0.0 0.0 0  | 0 0.0 01  | 00 0 0 0     | 1 010 | 0000 1222 | 21082000 | 2000000519 | 000735 | 07064400000 | 0000045 | 22   |     |    |
| 1328 | 1   | 151 | 100 | 11 | 0.000 | 0.2 0.0 0.2 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 0000 0022 | 21072000 | 2000000519 | 000823 | 07064400000 | 0000045 | 22   |     |    |
| 1329 | 1   | 751 | 200 | 11 | 0.000 | 0.1 0.0 0.1 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 0000 0022 | 21082000 | 2000000519 | 000910 | 07064400000 | 0000045 | 22   |     |    |
| 1330 | 1   | 151 | 131 | 11 | 0.000 | 0.1 1.0 0.6 1  | 0 0.0 02  | 00 0 0 0     | 0 010 | 1112 0022 | 11092002 | 2000000519 | 001100 | 07064400000 | 0000045 | 22   |     |    |
| 1331 | 1   | 151 | 100 | 11 | 0.000 | 0.2 0.0 0.2 0  | 0 0.0 01  | 00 0 0 0     | 3 010 | 1112 0022 | 11092002 | 2000000525 | 022126 | 02074400000 | 0000045 | 22   |     |    |
| 1332 | 1   | 151 | 100 | 11 | 0.000 | 0.7 0.0 0.7 0  | 0 0.0 01  | 00 0 0 0     | 3 010 | 1112 0022 | 11092002 | 2000000525 | 022126 | 02074400000 | 0000045 | 22   |     |    |
| 1333 | 1   | 151 | 100 | 11 | 0.000 | 0.2 0.0 0.2 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 1122 0022 | 11092002 | 2000000525 | 022126 | 02074400000 | 0000045 | 22   |     |    |
| 1334 | 3   | 151 | 100 | 11 | 0.000 | 1.5 0.0 1.5 0  | 0 0.0 01  | 00 0 0 0     | 5 010 | 0000 1322 | 11092002 | 2000000526 | 019404 | 07074400000 | 0000045 | 22   |     |    |
| 1335 | 3   | 232 | 100 | 11 | 0.000 | 0.2 0.0 0.2 0  | 0 19.5 01 | 00 0 0 0     | 0 031 | 1111 0022 | 12092204 | 2000000526 | 024232 | 05074400000 | 0000045 | 22   |     |    |
| 1336 | 3   | 232 | 100 | 11 | 0.000 | 0.4 0.0 0.4 0  | 0 0.0 01  | 00 0 0 0     | 0 031 | 1121 0022 | 13092204 | 2000000526 | 024232 | 05074400000 | 0000045 | 22   |     |    |
| 1337 | 3   | 434 | 100 | 11 | 0.000 | 2.7 0.0 2.7 0  | 0 0.0 01  | 00 0 0 0     | 0 022 | 1121 0022 | 12032000 | 2000000525 | 027633 | 05074400000 | 0000045 | 22   |     |    |
| 1338 | 1   | 751 | 232 | 11 | 0.000 | 0.0 0.8 0.5 3  | 1 0.3 03  | 00 0 0 0     | 0 031 | 0000 0022 | 23052002 | 2000000556 | 015634 | 05074400000 | 0000045 | 22   |     |    |
| 1339 | 1   | 751 | 200 | 52 | 4.000 | 2.3 0.0 2.5 0  | 0 2.7 01  | 00 0 0 0     | 0 122 | 1121 0022 | 23052002 | 2000000556 | 015634 | 05074400000 | 0000045 | 22   |     |    |
| 1340 | 3   | 252 | 111 | 11 | 0.000 | 0.6 1.4 1.1 1  | 0 0.0 03  | 00 0 0 0     | 0 031 | 1122 0022 | 23052002 | 2000000556 | 015634 | 05074400000 | 0000045 | 22   |     |    |
| 1341 | 3   | 252 | 100 | 11 | 0.000 | 2.5 0.0 2.5 0  | 0 3.5 01  | 00 0 0 0     | 0 010 | 0000 0022 | 12092000 | 2000000556 | 013101 | 04084400000 | 0000045 | 22   |     |    |
| 1342 | 3   | 732 | 200 | 51 | 0.000 | 2.7 0.0 2.7 0  | 0 0.0 01  | 00 0 0 0     | 1 010 | 1121 1122 | 23062001 | 2000000556 | 023135 | 27024500000 | 0000000 | 22   |     |    |
| 1343 | 3   | 732 | 200 | 51 | 0.000 | 0.9 0.0 0.9 0  | 2 0.0 01  | 00 0 0 0     | 1 021 | 0000 0022 | 21052000 | 2000000613 | 002423 | 05034500000 | 0000000 | 22   |     |    |
| 1344 | 3   | 732 | 200 | 51 | 0.000 | 0.0 0.0 0.0 0  | 2 0.0 01  | 00 0 0 0     | 1 021 | 0000 0022 | 21052000 | 2000000613 | 002602 | 05034500000 | 0000000 | 22   |     |    |
| 1345 | 3   | 752 | 200 | 52 | 9.000 | 0.0 0.0 0.0 0  | 0 0.0 01  | 00 0 0 0     | 1 021 | 0000 0022 | 21052000 | 2000000613 | 002703 | 05034500000 | 0000000 | 22   |     |    |
| 1346 | 3   | 434 | 100 | 11 | 0.000 | 5.3 0.0 5.3 0  | 0 0.0 01  | 00 0 0 0     | 0 031 | 0000 0022 | 23062100 | 2000000600 | 010617 | 28024500000 | 0000000 | 22   |     |    |
| 1347 | 1   | 151 | 141 | 52 | 5.200 | 0.6 1.7 1.3 1  | 2 0.3 03  | 00 0 0 0     | 1 110 | 1122 1222 | 21032102 | 2000000677 | 003033 | 00034500000 | 0250045 | 22   |     |    |
| 1348 | 1   | 151 | 132 | 51 | 1.500 | 0.6 1.5 1.3 3  | 0 0.2 04  | 00 0 0 0     | 1 031 | 1121 1221 | 23062002 | 2000000677 | 003033 | 00034500000 | 0250045 | 22   |     |    |
| 1349 | 1   | 252 | 141 | 52 | 2.500 | 0.1 1.5 1.3 3  | 0 0.0 08  | 00 0 0 0     | 1 010 | 1112 0022 | 22052003 | 2000000677 | 007123 | 00034500000 | 0250045 | 22   |     |    |
| 1350 | 1   | 454 | 100 | 11 | 0.000 | 1.0 0.0 1.0 0  | 6.1 01    | 00 0 0 0     | 1 010 | 1112 0022 | 23042201 | 2000000677 | 007123 | 00034500000 | 0250045 | 22   |     |    |
| 1351 | 3   | 252 | 100 | 11 | 0.000 | 3.1 0.0 3.1 0  | 2 0.0 01  | 00 0 0 0     | 0 022 | 1121 0022 | 23042201 | 2000000677 | 012032 | 00034500000 | 0250045 | 22   |     |    |
| 1352 | 3   | 151 | 121 | 11 | 0.000 | 1.2 3.3 2.3 1  | 0 0.0 02  | 00 0 0 0     | 0 010 | 1122 0022 | 11042002 | 2000002428 | 004319 | 00034500000 | 0000065 | 22   |     |    |
| 1353 | 3   | 454 | 100 | 52 | 3.000 | 2.9 0.0 2.5 0  | 0 0.0 01  | 00 0 0 0     | 0 032 | 0000 0022 | 13022000 | 2000002428 | 007314 | 00034500000 | 0000065 | 22   |     |    |
| 1354 | 3   | 454 | 111 | 52 | 2.500 | 0.4 3.5 1.9 1  | 0 0.0 02  | 00 0 0 0     | 0 010 | 0000 0022 | 22082100 | 2000002428 | 008824 | 00034500000 | 0000065 | 22   |     |    |
| 1355 | 3   | 151 | 100 | 11 | 0.000 | 1.8 0.0 1.8 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 0000 0022 | 12062000 | 2000002428 | 009602 | 00034500000 | 0000065 | 22   |     |    |
| 1356 | 3   | 151 | 111 | 11 | 0.000 | 1.6 3.1 2.4 1  | 0 0.0 02  | 00 0 0 0     | 0 010 | 0000 0022 | 12062000 | 2000002428 | 009728 | 00034500000 | 0000065 | 22   |     |    |
| 1357 | 3   | 414 | 111 | 52 | 2.000 | 0.5 2.1 1.3 1  | 0 0.0 02  | 00 0 0 0     | 2 021 | 0000 0022 | 12052000 | 2000002428 | 010026 | 00034500000 | 0000065 | 22   |     |    |
| 1358 | 3   | 151 | 141 | 11 | 0.000 | 1.3 6.5 3.9 1  | 0 0.0 02  | 00 0 0 0     | 0 010 | 1112 0022 | 11082001 | 2000002428 | 010232 | 00034500000 | 0000065 | 22   |     |    |
| 1359 | 3   | 151 | 100 | 11 | 0.000 | 0.1 0.0 0.1 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 1112 0022 | 11082001 | 2000002428 | 010232 | 00034500000 | 0000065 | 22   |     |    |
| 1360 | 3   | 353 | 100 | 11 | 0.000 | 11.0 0.0 1.0 0 | 0 0.0 01  | 00 0 0 0     | 3 022 | 1121 0022 | 11092002 | 2000002428 | 010735 | 00034500000 | 0000065 | 22   |     |    |
| 1361 | 3   | 252 | 300 | 11 | 0.000 | 4.0 0.0 4.0 0  | 0 0.0 01  | 00 0 0 0     | 0 032 | 1121 0022 | 11092002 | 2000002428 | 010735 | 00034500000 | 0000065 | 22   |     |    |
| 1362 | 3   | 252 | 100 | 11 | 0.000 | 0.7 0.0 0.7 0  | 0 0.0 01  | 00 0 0 0     | 0 032 | 1121 0022 | 11072002 | 2000002428 | 011511 | 00034500000 | 0000065 | 22   |     |    |
| 1363 | 3   | 151 | 111 | 52 | 4.000 | 1.0 2.9 1.9 2  | 0 0.0 02  | 00 0 0 0     | 3 010 | 1122 1222 | 23072002 | 2000002428 | 011939 | 00034500000 | 0000065 | 22   |     |    |
| 1364 | 3   | 353 | 111 | 11 | 0.000 | 2.6 1.5 2.0 1  | 0 0.0 02  | 00 0 0 0     | 0 032 | 1111 0022 | 22042002 | 2000002428 | 012636 | 00034500000 | 0000065 | 22   |     |    |
| 1365 | 3   | 352 | 111 | 11 | 0.000 | 0.2 1.6 1.1 1  | 0 0.0 03  | 00 0 0 0     | 0 032 | 1111 0022 | 22042002 | 2000002428 | 013939 | 00034500000 | 0000065 | 22   |     |    |
| 1366 | 3   | 252 | 111 | 51 | 0.000 | 1.4 2.2 2.0 1  | 0 0.0 03  | 00 0 0 0     | 4 010 | 0000 1322 | 23052000 | 2000002428 | 014522 | 00034500000 | 0000065 | 22   |     |    |
| 1367 | 3   | 252 | 100 | 51 | 0.000 | 1.1 0.0 1.1 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 0000 0022 | 23072000 | 2000002428 | 014916 | 00034500000 | 0000065 | 22   |     |    |
| 1368 | 3   | 252 | 100 | 51 | 0.000 | 1.1 0.0 1.1 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 1122 0022 | 13032001 | 2000002428 | 015027 | 00034500000 | 0000065 | 22   |     |    |
| 1369 | 3   | 454 | 100 | 11 | 0.000 | 0.3 0.0 0.3 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 1112 0022 | 23072001 | 2000002428 | 015217 | 00034500000 | 0000065 | 22   |     |    |
| 1370 | 3   | 454 | 111 | 11 | 0.000 | 1.1 1.7 1.5 1  | 0 0.0 03  | 00 0 0 0     | 0 010 | 1112 0022 | 23072001 | 2000002428 | 015217 | 00034500000 | 0000065 | 22   |     |    |
| 1371 | 3   | 454 | 111 | 11 | 0.000 | 1.4 1.5 1.6 1  | 0 0.0 03  | 00 0 0 0     | 0 010 | 1112 0022 | 23072003 | 2000002428 | 015217 | 00034500000 | 0000065 | 22   |     |    |
| 1372 | 3   | 454 | 100 | 11 | 0.000 | 2.4 0.0 2.4 0  | 0 0.0 01  | 00 0 0 0     | 0 010 | 1112 0022 | 23072005 | 2000002428 | 015217 | 00034500000 | 0000065 | 22   |     |    |

## SMALL ARMS EFFECTIVENESS DATA

| LSN | POS | AIM | RD/16 | FIRE TIME | R Q TIM     | TRG 2ND POSN | R M     | OTHR MSUM    | O A NO | REEL   | FRAME | DATE | BN B | R REG    | B MC       |             |             |             |         |    |
|-----|-----|-----|-------|-----------|-------------|--------------|---------|--------------|--------|--------|-------|------|------|----------|------------|-------------|-------------|-------------|---------|----|
|     | FSP | M   | A     | T         | IST SUB ALL | C I TO       | H R POS | PUL FS M A D | E C    | F VZHN | AN S  |      |      |          |            |             |             |             |         |    |
| 373 | 1   | 454 | 131   | 11        | 0.000       | 1.1          | 4.5     | 2.8          | 1      | 0      | 0.33  | 1121 | 0022 | 13072003 | 2000002429 | 003323      | 12054500035 | 0290000     | 22      |    |
| 374 | 3   | 454 | 111   | 11        | 0.000       | 1.8          | 2.5     | 2.2          | 1      | 0      | 0.0   | 0.0  | 0.0  | 11062000 | 2000002429 | 003726      | 12054500035 | 0290000     | 22      |    |
| 375 | 3   | 454 | 111   | 11        | 0.000       | 0.3          | 2.9     | 1.6          | 1      | 0      | 0.31  | 1121 | 0022 | 13052001 | 2000000198 | 010820      | 04104400035 | 0050000     | 22      |    |
| 376 | 3   | 454 | 111   | 11        | 0.000       | 0.2          | 3.7     | 2.5          | 1      | 0      | 0.31  | 1111 | 0022 | 11042001 | 2000000198 | 011130      | 04104400035 | 0050000     | 22      |    |
| 377 | 3   | 454 | 100   | 11        | 0.000       | 7.0          | 0.0     | 7.0          | 0      | 0      | 0.31  | 1111 | 0022 | 11052102 | 2000000198 | 011130      | 04104400035 | 0050000     | 22      |    |
| 378 | 3   | 232 | 160   | 11        | 0.000       | 1.5          | 0.3     | 1.5          | 0      | 0      | 0.31  | 1111 | 0022 | 13032001 | 2000000198 | 011630      | 04104400035 | 0050000     | 22      |    |
| 379 | 3   | 252 | 111   | 11        | 0.000       | 0.4          | 1.1     | 0.9          | 1      | 0      | 0.31  | 1111 | 0022 | 13062000 | 2000000198 | 011907      | 04104400035 | 0050000     | 22      |    |
| 380 | 3   | 151 | 111   | 11        | 0.000       | 0.9          | 2.7     | 2.1          | 1      | 0      | 0.33  | 1121 | 0022 | 21032101 | 2000000079 | 002121      | 25094400000 | 0000000     | 22      |    |
| 381 | 1   | 151 | 100   | 11        | 0.000       | 2.8          | 0.0     | 2.8          | 0      | 0      | 1     | 0.10 | 1224 | 1222     | 12042001   | 2000000067  | 003413      | 16094400000 | 0000015 | 22 |
| 382 | 3   | 151 | 100   | 11        | 0.000       | 0.6          | 0.0     | 0.6          | 0      | 0      | 1     | 0.10 | 1122 | 1222     | 23032004   | 2000000234  | 000702      | 17094400000 | 0000000 | 22 |
| 383 | 1   | 252 | 100   | 11        | 0.000       | 2.4          | 0.0     | 2.4          | 0      | 0      | 1     | 0.31 | 1121 | 1221     | 23062002   | 2000000226  | 003708      | 15074400000 | 0000015 | 22 |
| 384 | 3   | 434 | 100   | 11        | 0.000       | 2.6          | 0.0     | 2.6          | 0      | 0      | 1     | 0.31 | 1121 | 1221     | 23062002   | 2000000226  | 005420      | 15074400000 | 0000015 | 22 |
| 385 | 3   | 434 | 100   | 11        | 0.000       | 2.0          | 0.0     | 2.0          | 0      | 0      | 0     | 0.31 | 1111 | 0022     | 11052102   | 2000000200  | 019420      | 04104400035 | 0050000 | 22 |
| 386 | 3   | 333 | 100   | 11        | 0.000       | 1.8          | 0.0     | 1.9          | 0      | 0      | 0     | 0.31 | 1121 | 0022     | 22042103   | 2000000200  | 020310      | 04104400035 | 0050000 | 22 |
| 387 | 1   | 353 | 100   | 11        | 0.000       | 0.1          | 0.0     | 0.1          | 0      | 0      | 0     | 0.10 | 1112 | 0022     | 21042007   | 20000003461 | 024533      | 00000000000 | 0000000 | 22 |
| 388 | 3   | 252 | 111   | 11        | 0.000       | 0.8          | 0.3     | 0.5          | 1      | 0      | 0     | 0.10 | 1112 | 0022     | 23042004   | 20000003461 | 024533      | 00000000000 | 0000000 | 22 |
| 389 | 3   | 252 | 111   | 11        | 0.000       | 0.1          | 0.7     | 0.6          | 1      | 2      | 0     | 0.10 | 0900 | 1122     | 23042004   | 20000003461 | 037322      | 00000000000 | 0000000 | 22 |
| 390 | 3   | 454 | 100   | 11        | 0.000       | 0.0          | 0.0     | 0.1          | 0      | 0      | 2     | 0.10 | 0900 | 1122     | 23042004   | 20000003461 | 037322      | 00000000000 | 0000000 | 22 |
| 391 | 3   | 151 | 111   | 11        | 0.000       | 0.3          | 1.1     | 0.9          | 1      | 0      | 2     | 0.10 | 1112 | 1322     | 23062000   | 2000000085  | 033600      | 26094400015 | 0050000 | 22 |
| 392 | 1   | 131 | 100   | 11        | 0.000       | 2.1          | 0.0     | 2.1          | 0      | 0      | 0     | 0.31 | 1112 | 0021     | 21032001   | 2000000085  | 033600      | 26094400015 | 0050000 | 22 |
| 393 | 1   | 157 | 100   | 11        | 0.000       | 0.4          | 0.0     | 0.4          | 0      | 0      | 0     | 0.10 | 1111 | 0022     | 21052002   | 2000000085  | 033600      | 26094400015 | 0050000 | 22 |
| 394 | 1   | 151 | 100   | 11        | 0.000       | 0.2          | 0.0     | 0.2          | 0      | 0      | 2     | 0.10 | 1111 | 0022     | 11062001   | 2000000085  | 034928      | 26094400015 | 0050000 | 22 |
| 395 | 3   | 555 | 100   | 11        | 0.000       | 0.7          | 0.0     | 0.7          | 0      | 0      | 0     | 0.31 | 1112 | 0022     | 21042002   | 2000000044  | 036017      | 16084400000 | 0000000 | 22 |
| 396 | 3   | 151 | 100   | 11        | 0.000       | 0.7          | 0.0     | 0.7          | 0      | 0      | 0     | 0.10 | 1111 | 0022     | 23032001   | 2000000044  | 036017      | 16084400000 | 0000000 | 22 |
| 397 | 3   | 151 | 100   | 11        | 0.000       | 1.2          | 0.0     | 1.2          | 0      | 0      | 0     | 0.10 | 1111 | 0022     | 23042003   | 2000000044  | 036304      | 16084400000 | 0000000 | 22 |
| 398 | 3   | 151 | 100   | 11        | 0.000       | 2.7          | 0.0     | 2.7          | 0      | 0      | 0     | 0.10 | 1111 | 0022     | 23032001   | 2000000044  | 036309      | 16084400000 | 0000000 | 22 |
| 399 | 3   | 151 | 131   | 11        | 0.000       | 1.4          | 3.2     | 2.5          | 1      | 0      | 0     | 0.10 | 1121 | 0022     | 22052003   | 2000000044  | 036929      | 16084400000 | 0000000 | 22 |
| 400 | 3   | 252 | 100   | 11        | 0.000       | 1.6          | 0.0     | 1.9          | 0      | 0      | 0     | 0.33 | 0000 | 0022     | 13052000   | 2000000132  | 016217      | 05054500035 | 0070000 | 22 |
| 401 | 3   | 232 | 111   | 11        | 0.000       | 2.0          | 0.0     | 2.0          | 0      | 0      | 0     | 0.33 | 1111 | 0022     | 23042002   | 2000000127  | 024217      | 02054500000 | 0000000 | 22 |
| 402 | 3   | 131 | 100   | 11        | 0.000       | 4.4          | 0.0     | 4.4          | 0      | 1      | 0     | 0.10 | 1121 | 0022     | 23092003   | 2000000087  | 023618      | 09104400000 | 0000000 | 22 |
| 403 | 1   | 151 | 111   | 11        | 0.000       | 5.1          | 4.5     | 4.4          | 1      | 0      | 0     | 0.31 | 0000 | 0022     | 13072000   | 2000001528  | 005723      | 00054500000 | 0000000 | 22 |
| 404 | 3   | 111 | 131   | 11        | 0.000       | 1.6          | 10.9    | 6.3          | 1      | 0      | 0     | 0.31 | 1111 | 0021     | 23022002   | 2000001528  | 007006      | 00054500000 | 0000000 | 22 |
| 405 | 2   | 111 | 111   | 11        | 0.000       | 3.3          | 3.5     | 3.5          | 1      | 0      | 0     | 0.31 | 1111 | 0021     | 23022003   | 2000001528  | 007006      | 00054500000 | 0000000 | 22 |
| 406 | 2   | 111 | 111   | 11        | 0.000       | 1.2          | 0.0     | 1.2          | 0      | 0      | 6     | 0.21 | 1121 | 0021     | 21062002   | 2000001528  | 008817      | 00054500000 | 0000000 | 22 |
| 407 | 3   | 454 | 100   | 11        | 0.000       | 3.1          | 0.0     | 3.1          | 0      | 0      | 0     | 0.21 | 1121 | 0021     | 21062002   | 2000001528  | 008817      | 00054500000 | 0000000 | 22 |
| 408 | 3   | 414 | 160   | 11        | 0.000       | 0.3          | 0.0     | 0.3          | 0      | 0      | 0     | 0.21 | 1121 | 0021     | 21062002   | 2000001528  | 008817      | 00054500000 | 0000000 | 22 |
| 409 | 3   | 414 | 100   | 11        | 0.000       | 0.4          | 0.0     | 0.4          | 0      | 0      | 0     | 0.32 | 0900 | 0021     | 13092000   | 2000000208  | 004426      | 01074400000 | 0000000 | 22 |
| 410 | 3   | 252 | 100   | 11        | 0.000       | 3.5          | 3.7     | 3.7          | 1      | 0      | 0     | 0.31 | 0900 | 0022     | 12052000   | 2000000208  | 007325      | 01074400000 | 0000000 | 22 |
| 411 | 3   | 454 | 142   | 11        | 0.000       | 0.0          | 2.1     | 1.6          | 1      | 1      | 0     | 0.31 | 0900 | 0022     | 22042100   | 20000002457 | 001213      | 01064500000 | 0000000 | 22 |
| 412 | 1   | 111 | 111   | 11        | 0.000       | 0.2          | 1.6     | 1.1          | 1      | 0      | 0     | 0.10 | 1122 | 0022     | 23042002   | 20000002459 | 008915      | 04064500015 | 0040005 | 22 |
| 413 | 3   | 454 | 111   | 11        | 0.000       | 0.7          | 0.0     | 0.7          | 0      | 0      | 0     | 0.33 | 1111 | 0021     | 23042006   | 20000002459 | 013716      | 00054500000 | 0000000 | 22 |
| 414 | 3   | 151 | 100   | 11        | 0.000       | 0.3          | 0.0     | 0.3          | 0      | 0      | 0     | 0.33 | 1121 | 0021     | 12092005   | 20000002459 | 015000      | 00054500000 | 0000000 | 22 |
| 415 | 3   | 151 | 100   | 11        | 0.000       | 0.6          | 2.0     | 1.3          | 2      | 1      | 0     | 0.10 | 0900 | 1222     | 11062000   | 20000002459 | 022525      | 14064500000 | 0000000 | 22 |
| 416 | 3   | 252 | 111   | 11        | 0.000       | 3.4          | 6.5     | 3.1          | 1      | 0      | 0     | 0.21 | 0900 | 0021     | 13042000   | 20000002477 | 022025      | 14064500000 | 0000000 | 22 |
| 417 | 3   | 252 | 111   | 11        | 0.000       | 0.2          | 3.9     | 2.1          | 1      | 0      | 0     | 0.10 | 1121 | 0022     | 13072001   | 20000002477 | 022635      | 14064500000 | 0000000 | 22 |
| 418 | 3   | 252 | 111   | 11        | 0.000       | 2.4          | 3.1     | 2.8          | 1      | 0      | 0     | 0.31 | 0900 | 0022     | 11062000   | 20000002481 | 033312      | 06204500000 | 0000065 | 22 |
| 419 | 3   | 252 | 111   | 11        | 0.000       | 1.7          | 2.2     | 2.0          | 1      | 0      | 3     | 0.10 | 0900 | 0022     | 13062000   | 20000002481 | 033906      | 06204500000 | 0000065 | 22 |
| 420 | 3   | 252 | 111   | 11        | 0.000       | 1.5          | 6.2     | 3.9          | 1      | 2      | 1     | 0.10 | 1122 | 1122     | 11062002   | 20000002494 | 036430      | 00064500000 | 0290000 | 22 |

## SMALL ARMS EFFECTIVENESS DATA

| L    | Q | POS | AIM | RD/16 | FIRE  | TIME | R    | D   | TIM | TRG | 2ND | POSN | R | M | G | E | C   | U    | OTHER | MSUM     | Q          | A      | NO          | REEL    | FRAME   | DATE | BN | B | R | REG | OIV | L |
|------|---|-----|-----|-------|-------|------|------|-----|-----|-----|-----|------|---|---|---|---|-----|------|-------|----------|------------|--------|-------------|---------|---------|------|----|---|---|-----|-----|---|
|      |   | FSP | M   | A     | 1ST   | SUB  | ALL  | H   | R   | POS | PUL | FS   | M | A | D | E | C   | F    | VZHN  | AN       | S          | R      | R           | REG     | B       | MC   |    |   |   |     |     |   |
| 1422 | 3 | 353 | 100 | 11    | 0.000 | 2.7  | 0.0  | 2.7 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 010 | 0000 | 0022  | 13072000 | 2000002493 | 023312 | 00064500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1423 | 3 | 353 | 100 | 11    | 0.000 | 1.7  | 0.0  | 1.7 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 010 | 0000 | 0022  | 13052000 | 2000002493 | 023537 | 00064500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1424 | 3 | 353 | 111 | 11    | 0.000 | 2.1  | 1.8  | 2.3 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 010 | 0000 | 0022  | 13052000 | 2000002493 | 023738 | 00064500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1425 | 3 | 212 | 100 | 11    | 0.500 | 1.2  | 0.0  | 1.2 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 021 | 1111 | 0022  | 23032001 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1426 | 3 | 252 | 111 | 11    | 0.000 | 0.3  | 2.6  | 1.5 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 021 | 1111 | 0022  | 23032002 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1427 | 3 | 212 | 111 | 21    | 0.000 | 1.0  | 1.8  | 1.7 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 031 | 1111 | 0022  | 23022003 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1428 | 3 | 252 | 100 | 11    | 0.000 | 0.2  | 0.0  | 0.2 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 031 | 1111 | 0022  | 23032004 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1429 | 3 | 232 | 100 | 11    | 0.300 | 1.6  | 0.0  | 1.6 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 031 | 0000 | 0022  | 12062000 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1430 | 3 | 232 | 100 | 11    | 0.000 | 1.5  | 0.0  | 1.5 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 031 | 0000 | 0022  | 13062000 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1431 | 3 | 232 | 100 | 11    | 0.000 | 4.6  | 0.0  | 4.6 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 3 | 031 | 0000 | 0022  | 13062000 | 2000002508 | 001120 | 00054500000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1432 | 1 | 751 | 200 | 11    | 0.000 | 0.9  | 0.0  | 0.9 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 1 | 022 | 1121 | 0022  | 12042003 | 2000002508 | 013705 | 00054500000 | 0010000 | 0010000 | 22   |    |   |   |     |     |   |
| 1433 | 1 | 751 | 200 | 11    | 0.000 | 0.9  | 0.0  | 0.9 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 1 | 010 | 1112 | 1122  | 21042001 | 2000002608 | 032005 | 27034400000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1434 | 3 | 751 | 211 | 11    | 0.000 | 0.5  | 0.4  | 0.5 | 1   | 2   | 0   | 0    | 0 | 0 | 0 | 1 | 110 | 1112 | 1122  | 22092002 | 2000002608 | 031932 | 27034400000 | 0000000 | 0000000 | 22   |    |   |   |     |     |   |
| 1435 | 3 | 252 | 100 | 11    | 0.000 | 3.5  | 0.0  | 3.5 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 1 | 022 | 1112 | 1222  | 21062004 | 2000001484 | 000616 | 03095000000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1436 | 3 | 252 | 100 | 11    | 0.000 | 4.0  | 0.0  | 4.0 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 1 | 032 | 1111 | 1222  | 23052001 | 2000001484 | 000616 | 03095000000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1437 | 3 | 252 | 111 | 11    | 0.000 | 2.3  | 1.4  | 3.1 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 2 | 010 | 1111 | 0022  | 11042003 | 2000001484 | 001632 | 03095000000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1438 | 3 | 252 | 111 | 21    | 0.090 | 1.6  | 0.7  | 2.1 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 2 | 022 | 1111 | 0022  | 23062005 | 2000001484 | 001632 | 03095000000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1439 | 3 | 454 | 100 | 52    | 5.000 | 4.8  | 0.0  | 5.2 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 2 | 032 | 1111 | 1222  | 23042003 | 2000001484 | 002010 | 03095000000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1440 | 1 | 353 | 100 | 11    | 0.000 | 2.1  | 0.0  | 2.1 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1122 | 0022  | 23092001 | 2000001181 | 001429 | 04035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1441 | 1 | 454 | 100 | 11    | 0.000 | 2.2  | 0.0  | 2.2 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1122 | 0022  | 23082001 | 2000001181 | 001429 | 04035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1442 | 3 | 353 | 100 | 51    | 0.000 | 0.7  | 0.0  | 0.7 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 021 | 0000 | 0022  | 12032000 | 2000001204 | 029514 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1443 | 3 | 353 | 100 | 51    | 0.000 | 0.1  | 0.0  | 0.1 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 021 | 0000 | 0022  | 12032000 | 2000001204 | 029516 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1444 | 3 | 353 | 111 | 52    | 2.300 | 1.5  | 1.4  | 1.4 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 031 | 0000 | 0022  | 12032000 | 2000001204 | 029611 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1445 | 3 | 353 | 100 | 11    | 0.000 | 0.0  | 0.0  | 0.0 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 031 | 0000 | 0022  | 13022100 | 2000001204 | 031712 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1446 | 3 | 353 | 100 | 11    | 0.000 | 2.3  | 0.0  | 2.3 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 031 | 0000 | 0022  | 13022100 | 2000001204 | 032103 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1447 | 3 | 353 | 111 | 51    | 1.200 | 2.6  | 1.0  | 1.3 | 3   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 0000 | 0022  | 13042000 | 2000001204 | 034605 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1448 | 3 | 353 | 111 | 51    | 1.300 | 4.2  | 0.7  | 1.6 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 0000 | 0022  | 13042000 | 2000001204 | 035127 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1449 | 3 | 351 | 142 | 11    | 0.000 | 0.4  | 2.0  | 1.8 | 3   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 021 | 0000 | 0022  | 13022000 | 2000001204 | 035538 | 23035100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1450 | 3 | 252 | 100 | 11    | 0.000 | 3.6  | 0.0  | 3.6 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1122 | 0022  | 13032004 | 2000001299 | 014610 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1451 | 3 | 252 | 141 | 21    | 0.000 | 2.7  | 12.5 | 7.6 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1122 | 0022  | 11091001 | 2000001299 | 015038 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1452 | 3 | 171 | 111 | 21    | 0.000 | 0.5  | 1.3  | 1.2 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1112 | 0022  | 11082001 | 2000001299 | 024802 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1453 | 3 | 157 | 100 | 11    | 0.000 | 2.5  | 0.0  | 2.5 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1112 | 0022  | 13092002 | 2000001299 | 025202 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1454 | 3 | 157 | 100 | 11    | 0.000 | 4.3  | 2.0  | 5.7 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1112 | 0022  | 23092003 | 2000001299 | 024802 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1455 | 3 | 313 | 111 | 11    | 0.000 | 0.0  | 2.3  | 1.2 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 031 | 1112 | 0022  | 13092205 | 2000001299 | 027729 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1456 | 3 | 313 | 111 | 11    | 0.000 | 3.2  | 2.4  | 2.8 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 0 | 010 | 1111 | 0022  | 23092204 | 2000001299 | 027729 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1457 | 3 | 454 | 111 | 11    | 0.000 | 1.0  | 1.0  | 1.0 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 022 | 1111 | 0022  | 12091202 | 2000001299 | 031934 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1458 | 3 | 232 | 141 | 11    | 0.000 | 3.3  | 4.2  | 7.2 | 2   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 032 | 1111 | 0022  | 11032201 | 2000001299 | 031803 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1459 | 3 | 414 | 141 | 11    | 0.000 | 2.2  | 0.0  | 2.2 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 022 | 1111 | 0022  | 11102203 | 2000001299 | 032231 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1460 | 3 | 454 | 100 | 11    | 0.000 | 2.5  | 1.6  | 2.1 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 010 | 1111 | 0021  | 23042004 | 2000001299 | 032115 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1461 | 3 | 111 | 111 | 11    | 0.000 | 0.8  | 0.0  | 0.8 | 0   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 010 | 1112 | 0022  | 13102001 | 2000001299 | 033118 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1462 | 3 | 252 | 100 | 11    | 0.000 | 1.4  | 7.0  | 4.2 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 010 | 1112 | 0022  | 13102001 | 2000001299 | 033415 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1463 | 3 | 252 | 141 | 11    | 0.000 | 0.3  | 7.7  | 4.0 | 1   | 0   | 0   | 0    | 0 | 0 | 0 | 7 | 010 | 1112 | 0022  | 13052001 | 2000001299 | 034533 | 29055100000 | 0000000 | 0000000 | 23   |    |   |   |     |     |   |
| 1464 | 3 | 454 | 141 | 11    | 0.000 | 0.3  | 7.7  | 4.0 |     |     |     |      |   |   |   |   |     |      |       |          |            |        |             |         |         |      |    |   |   |     |     |   |

## Appendix F

### FURTHER DATA ON CDEC AND IB TESTING RANGES AND NEW RANGE EQUIPMENT AVAILABLE

#### INTRODUCTION

This appendix supplements and adds detail to the information on the small arms testing ranges discussed in Chapter V. It also describes range target systems and components that are available for instrumenting such ranges but are not now being used. The range complexes are (1) the U.S. Army Infantry Board (IB) ranges at Fort Benning, Georgia, and (2) the test ranges at U.S. Army Combat Developments Experimentation Command (CDEC), Hunter Liggett Military Reservation (HLMR), California.

#### U.S. ARMY INFANTRY BOARD (IB) RANGES

##### History

The U.S. Army Infantry Board (IB) has three small arms test ranges. Design was begun in 1965, and though the first service tests were conducted in 1970, a prototype "attack range" was built in 1965. It was manually controlled, and data were collected on an oscillograph and paper-tape recorders. In 1968, the "quick-fire range" was completed, and in 1970, the "defense range." The defense range was the first computer-automated test range at Fort Benning. All three ranges are now computer-operated, and the same computer does all major data collection.

As each range was completed, an "acceptance" test was conducted to determine how well it functioned. Each test proved the instrumentation to be very reliable.\* Since their completion, the ranges have been used heavily. Examples of small arms tests recently conducted on the ranges are listed in Table F-1. Since a single computer and control system

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\*U.S. Army Infantry Board, Defense Experiment I (Ft. Benning, GA, 25 November 1971); hereafter referred to as Defense Experiment I.

Table F-1

## SMALL ARMS TESTS RECENTLY CONDUCTED ON IB RANGES

| Test <sup>a</sup>                                     | Date |
|-------------------------------------------------------|------|
| Combat pack with removable pockets .....              | 1973 |
| Rimfire adapter, M16 .....                            | 1974 |
| Reflex columnator sight, M16 .....                    | 1974 |
| Muzzle break compensator, M16 .....                   | 1974 |
| Control burst mechanism, M16 .....                    | 1974 |
| Chemical protective overgarment .....                 | 1974 |
| Body armor vest .....                                 | 1974 |
| Improved conventional munitions .....                 | 1974 |
| Bandoleer, XM-8 .....                                 | 1974 |
| Accuracy test, M60 .....                              | 1974 |
| Low light level sight, M16 .....                      | 1974 |
| Small arms measures of effectiveness methodology .... | 1974 |
| Airborne equipment methodology .....                  | 1974 |
| Night operations test .....                           | 1974 |
| Squad automatic weapons engineering test .....        | 1974 |

<sup>a</sup>These are informal titles for the tests. The list is not exhaustive but indicates the variety of tests undertaken.

support each range separately, only one range can be used at a time. A single range is used approximately 60-85 hours per month.

### Instrumentation

#### Targets

All three ranges use the stationary head and upper torso (M-silhouette) target and one or more moving targets.\* The numbers and types of each are summarized in Table F-2.

Table F-2

NUMBER AND TYPES OF TARGETS ON IB TEST RANGES

| Type of Target      | Defense Range <sup>a</sup> | Attack Range <sup>b</sup> | Quick-Fire Range |
|---------------------|----------------------------|---------------------------|------------------|
| Stationary (pop-up) | 88 <sup>c</sup>            | 10                        | 25               |
| Moving (pop-up)     | 6                          | 1                         | 1                |

<sup>a</sup>In Chapter V, the firing situation for this range is called "Firing at targets at closer ranges." "Defense" is used in this appendix for simplicity and because it is the term IB uses.

<sup>b</sup>In Chapter V, the firing situation for this range is called "Assault." "Attack" is used in this appendix for simplicity and because it is the term IB uses.

<sup>c</sup>To the 60 day time targets, 28 close-in targets were added for use in night testing.

#### Programming Target Array

A radio link is used to transmit hit data for moving targets, and relays are used for the stationary targets. All targets can be programmed to appear and reappear in any sequence for varying durations.

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\*The head and upper torso target has a presented area of 3.27 sq ft (as described in Chapter V). It will be referred to as the "kneeling-man" target throughout this appendix. Moving and stationary targets are described in Chapter V. Moving targets are also called "running-man" targets.

They can be programmed to stay in view for a certain time or to drop when hit. For checkout or trial, they can be controlled manually from the computer van.

The attack range normally uses a fixed, programmed target scenario; the defense range uses several scenarios; and the quick-fire range uses a sort of shooting gallery, where a single firer moves through a prescribed course, automatically activating targets and simulators.

#### Near-Miss Sensors

A time-difference near-miss sensor capable of scoring miss distance and miss direction is used on the ranges. Each target array on the defense range and each target on the quick-fire range has a set of four microphones positioned in front of the targets. The target line on the attack range has three near-miss sensors. The microphones tally near misses by sensing the shock wave of passing rounds.

The set of microphones is located along an axis perpendicular to the line of flight of the projectile and directly in front of the target so that the target is at the exact center of the line of microphones. The four microphones are positioned 5 ft and 7 ft from the target, one pair on each side. The supersonic shock wave of a projectile passing over the area between the pairs of microphones causes the microphones to send pulses over the coaxial data link. Their time of arrival is recorded by the computer just as are the pulses from the system to count rounds fired. The times of arrival of the shock wave at one pair and then the other pair of microphones are used to create equations that include the geometric configuration of the microphone location. The two equations thus produced can be solved for the x and y coordinates of the near miss as the projectile passed through the vertical plane of the target array. The resolution of the system, under ideal conditions, exceeds 3 inches.

Since only one target in each target array of three to five targets on the defense range is equipped with the miss distance indicator (MDI), described above, information on miss distance is collected by sample. It is assumed that other targets in the array undergo similar patterns of misses when they are in view. Not all targets have an MDI because of

the limited number of data recording channels (256). Each microphone requires one channel, so a set requires four channels. The target requires two other channels, one for hit recording and another that informs the computer that up and down commands have been carried out. Six input channels per target would quickly use up the available channels. Sampling permits more targets to be added without having to add an equal number of miss-distance microphones. A ratio of two targets for each MDI is maintained, however.

Near misses can be measured around each target position on the range, 16 of the 60 targets on the daytime defense range and 3 targets on the attack range.

Interference from small arms simulators is prevented by turning off the microphones (i.e., the computer does not record incoming data from nearby microphones while a simulator is firing).<sup>\*</sup> However, the probability of not recording a near miss while the microphones are turned off is very low.

#### Round Counters

The system for automatically counting rounds in station target firing consists of a sensor, data link, signal conditioner, and computer system. The sensor unit consists of one microphone located directly in front of each firing position. The microphone is attached to a single coaxial cable, which in turn is linked to the signal-conditioning unit in the computer van. The signal conditioner, one per microphone input, "conditions" by discriminating between the actual signal and extraneous noise and creates a pulse for computer input for each signal received. The pulse is fed directly into the computer interface unit that measures time of arrival.

The round-counting system for the attack range consists of a helmet-mounted radio system. The sensor element consists of two parts: an

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<sup>\*</sup>U.S. Army Infantry Board, Technical Memorandum: Scoring Resolution of a Time Difference Miss Distance Scoring System (Ft. Benning, GA, December 1967).

infrared (IR) sensor that "sees" the muzzle blast and turns on an acoustic sensor, which senses the sound of the muzzle report. The short time "window" (the period of time the acoustic sensor is on) prevents "cross-talk" among firers. If a firer happens to be looking at an adjacent firer as the latter's rifle discharges, his IR sensor will open the circuit for the acoustic sensor; however, the window will close before the report of the adjacent firer's weapon arrives. Once a signal passes through the window, it is conditioned and placed on the RF carrier for transmission to the computer van. Tests have shown that firers must be separated by at least 4 ft to prevent crosstalk. Some crosstalk occurs between 4 ft and 16 ft, the degree diminishing with distance. No cross-talk has occurred with 16 ft of separation.\*

#### Recording Equipment

The recording (and target control) equipment consists of a PDP 15/30 computer and its interface equipment. All data recording programs are prepared automatically as the target control programs are written. The programs are written in a programming language close to natural English.\*\* When they are compiled by the computer to produce the actual program, the necessary data-collection routines are added. During the trial run, the computer controls the range according to the instructions of the program preparer and collects the data. A hard-copy "end-of-trial" summary is automatically produced.

Before each trial begins, the computer asks the operator for time, date, and other logging-in information. The information is recorded on magnetic tape along with the substantive data from the trial. The summary recaps each trial in terms of the number of rounds fired by each firer, hits by target, and near misses sensed by microphone. Programs are available to produce other types of hard-copy output.

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\*U.S. Army Combat Development Experimentation Command, MFR--Live Fire Test of California Avionics Laboratories Inc. Portable Round Count System (Ft. Ord, CA, 20 June 1973).

\*\*Janes, Mean and Dakon, USAIB Compiler User's Guide (Ft. Benning, GA, February 1971).

The computer has three mini-magnetic tape drives, two teletype printers, one high-speed line printer, a high-speed paper-tape reader and punch, and is equipped with a memory-protection unit that prevents the loss of data in the event of a power failure. It uses either generator power or commercial power. It has 256 lines for data input and 128 lines for range control. A library of programs exists for range control.

#### Reliability of Instrumentation

The reliability of instrumentation subsystems is reported to be very good. It takes seven hours to move the computer van the 12 miles from the Infantry Board main post at Fort Benning to the range complex, connect it, and check it out. If the range has not been used for a month or more, about two weeks are required to install and recheck the range components. These are current estimates using the new equipment, such as radio data links, installed in recent years.

#### Rifle Situations

Up to four firers at a time can fire on the attack range,\* up to ten on the defense range, and a single firer on the quick-fire range.

#### Range Layouts

Figures F-1 through F-3 depict the layouts of the three IB ranges.

#### Cost

The procurement cost of instrumentation components for the IB is shown in Table F-3.

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\* U.S. Army Infantry Board, A Pilot Experiment, Attack Experiment I, Small Arms Service Test Design for a Study of Small Arms Test Facilities and Methods, USAIB Project 3091 (Ft. Benning, GA, June 1966).

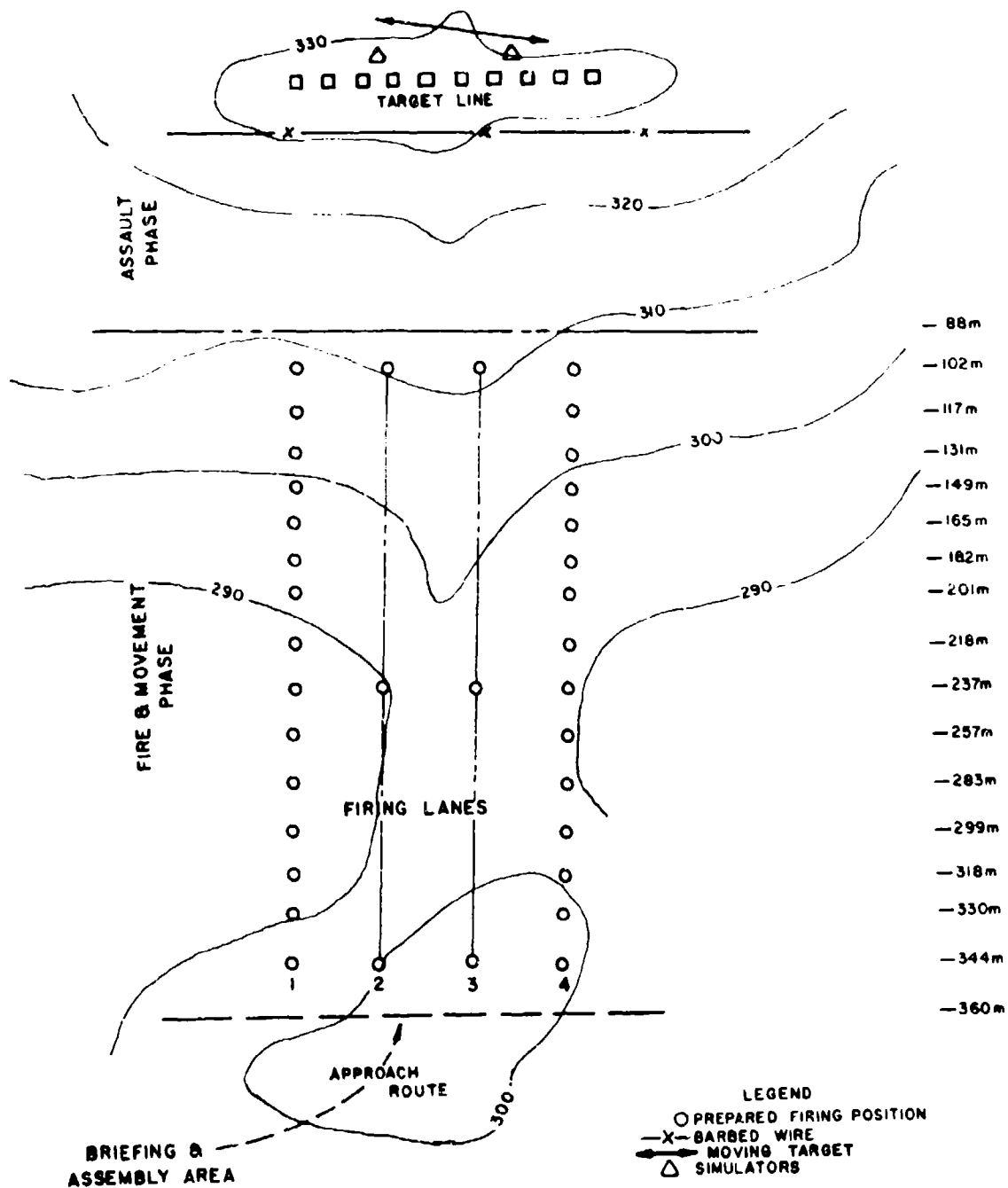


Figure F-1. Layout of IB attack range.

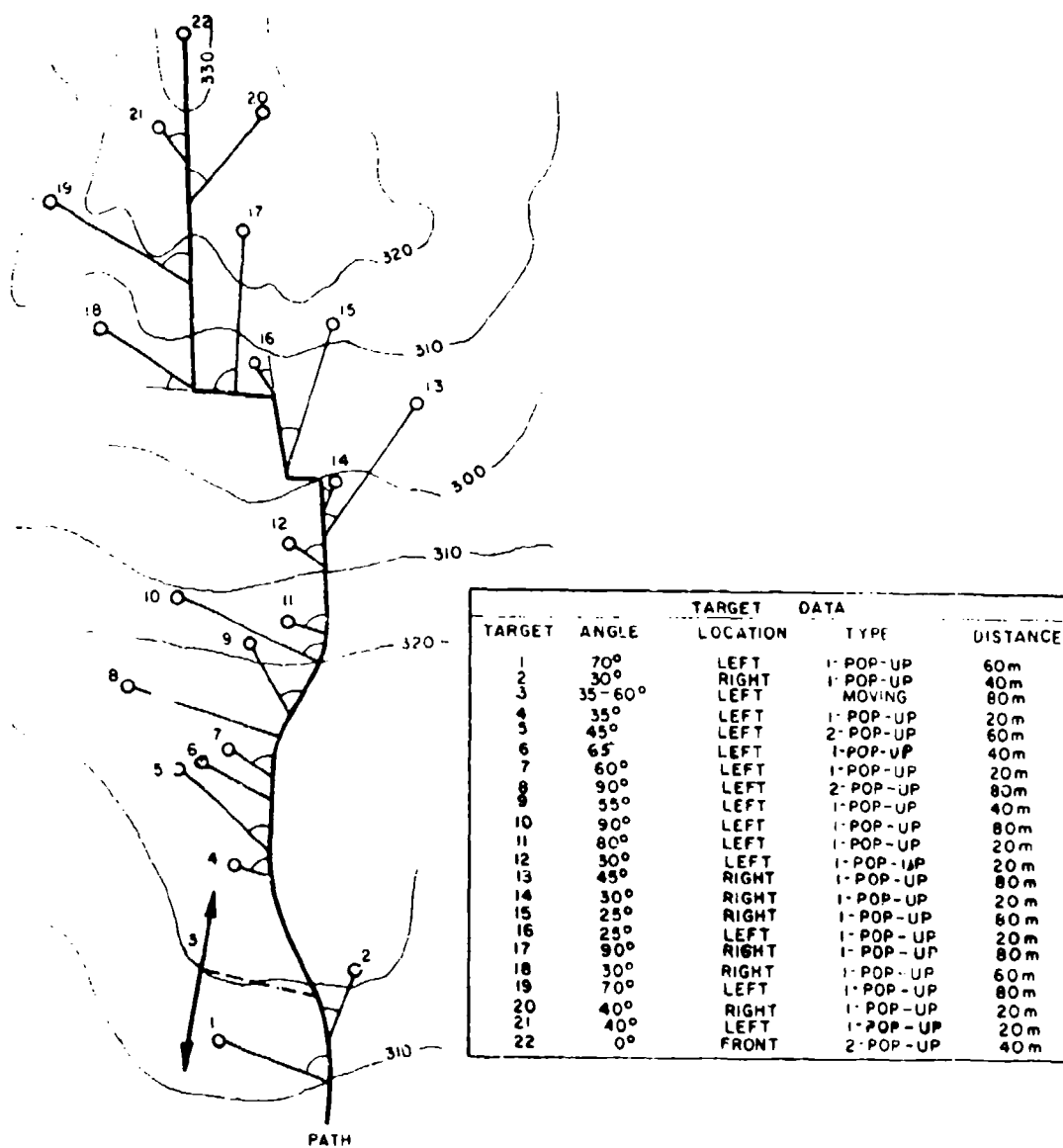


Figure F-2. Layout of IB quick-fire range. Adapted from Litton Systems Inc., Mellonics Systems Development Division, Infantry Weapons Test Methodology Study, Quick-fire Experiment I, by Ronald D. Klein (Ft. Benning, GA, 27 June 1969), p. 72.

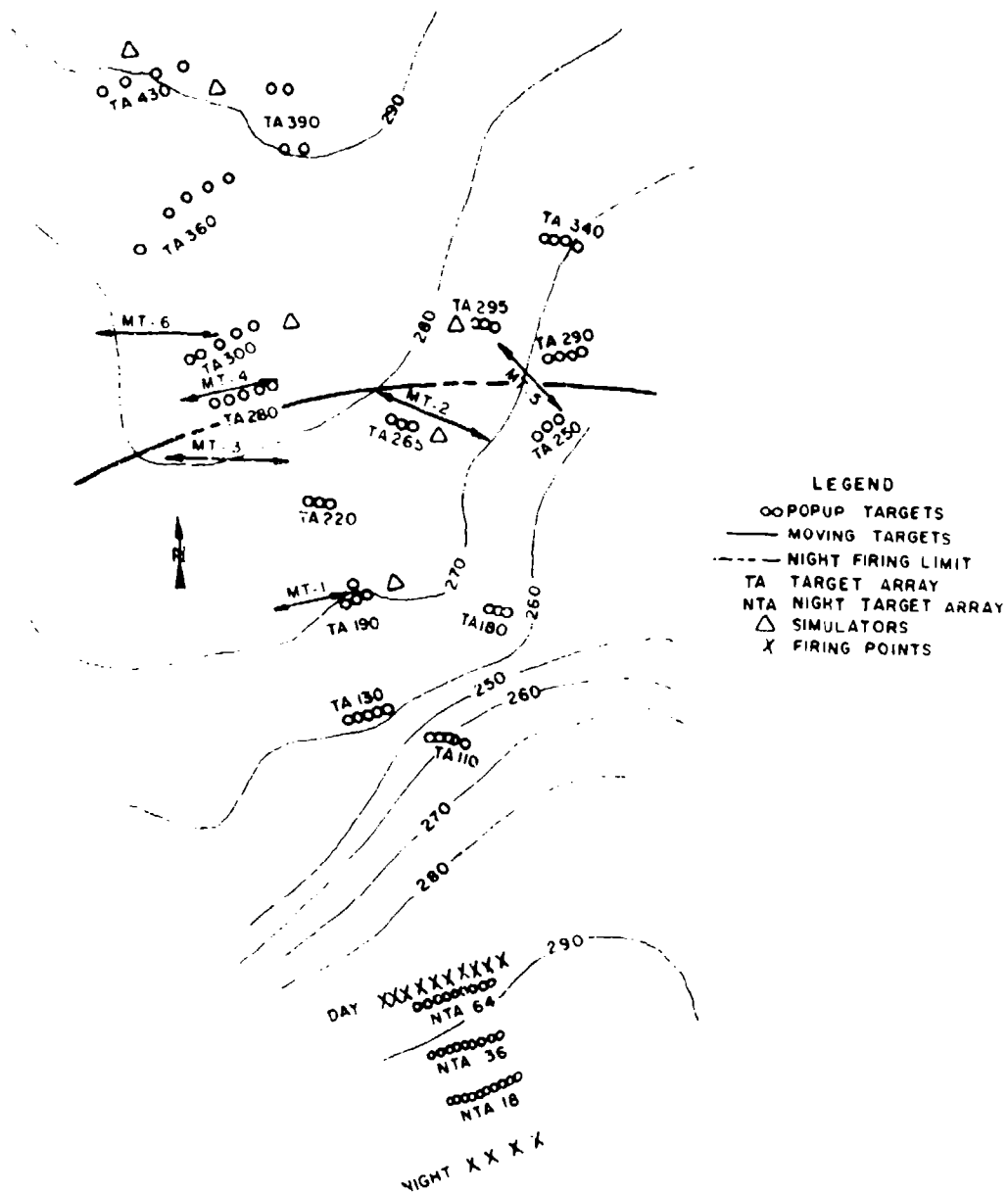


Figure F-3. Layout of IB day and night defense range.  
Adapted from IB, Defense Experiment 1, pp. 1-2 and 1-3.

Table F-3

ESTIMATED COST OF PROCURING IB DEFENSE RANGE  
(1974 DOLLARS)

| Equipment                                                                                      | Cost                               |
|------------------------------------------------------------------------------------------------|------------------------------------|
| <b>Target instrumentation</b>                                                                  |                                    |
| Raising and lowering mechanism<br>(88 @ \$350) .....                                           | \$ 30,800                          |
| Moving man target (100-ft track)<br>(6 @ \$4,000) .....                                        | 24,000                             |
| Weapon-signature simulator<br>(5 @ \$1,200) .....                                              | 6,000                              |
| Hit sensor (target body)<br>(88 @ \$4) .....                                                   | 352                                |
| Near-miss sensor (64 microphones--16<br>target arrays with 4 microphones<br>each @ \$60) ..... | 3,840                              |
| Round counter (10 @ \$60) .....                                                                | 600                                |
| Wire network .....                                                                             | 16,000                             |
| Subtotal                                                                                       | \$ 81,592                          |
| <b>Recording Equipment</b>                                                                     |                                    |
| PDP 15/30 computer .....                                                                       | \$ 49,500                          |
| Automatic addressor .....                                                                      | 25,000                             |
| Signal conditioner .....                                                                       | 16,000                             |
| Air conditioner .....                                                                          | 500                                |
| Software .....                                                                                 | 60,000                             |
| Subtotal                                                                                       | \$151,000                          |
| Installation .....                                                                             | \$250,000                          |
| Total                                                                                          | \$482,592 (\$331,592) <sup>a</sup> |

<sup>a</sup>The \$482,592 is misleading to the extent that it includes the \$151,000 for recording equipment, which is not procured independently for each range but is shared among the three ranges. The figure in parentheses represents the truer cost of just setting up the defense range consisting of 88 stationary and 6 moving targets.

Personnel to operate the ranges are summarized below. Since only one range can be operated at a time, these personnel are adequate for all ranges.

ADP Personnel:

1 programmer

1 programmer/operator

Others (numbers unknown):

Ammunition handlers

Range guards

Medics

Range Personnel:

1 electrical engineer

2 electronic technicians

2-4 controllers

1 statistician

1 range officer

The estimated daily cost of operating a single range is \$540. This includes the services of 6-8 military personnel, 3 Army-employed civilians, and all expendables such as target-body replacements.\*

U.S. ARMY COMBAT DEVELOPMENTS EXPERIMENTATION  
COMMAND (CDEC) SMALL ARMS RANGE

History

The U.S. Army Combat Developments Experimentation Command (CDEC) has three live firing ranges at Hunter Liggett Military Reservation (HLMR), California. Two of the ranges were initially installed at Fort Ord, California, conceived and designed especially for the CDEC-SAWS experiment discussed in Chapter IV. The equipment was moved to HLMR and installed in a different range layout in the spring of 1966. In 1972, a separate "moving target" range was installed at HLMR. The three ranges are designated Alpha, Bravo, and moving target, respectively. The configuration has not changed since. Examples of experiments recently conducted at CDEC are listed in Table F-4.

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\*This \$540/day estimate is based on estimated personnel costs of \$480/day plus a target-body replacement cost of \$60/day. The target-body replacement was estimated as follows: for 10 trials a day, 60 targets exposed per trial, 2-3 hits per target, a replacement estimate of 25 percent was used ( $2.5 \times 60 \text{ targets} \times 25\% = 15 \text{ targets replaced per day}$  x \$4 per target = \$60/day).

Table F-4

## SMALL ARMS EXPERIMENTS RECENTLY CONDUCTED AT CDEC

| Experiment <sup>a</sup>                            | Year      |
|----------------------------------------------------|-----------|
| Comparison of XM19 and M16 (CDEC 21.9) .....       | 1972      |
| Army small arms rifle study (ASARS) II .....       | 1973-1974 |
| Parapet-Foxhole (PAR-FOX) .....                    | 1974      |
| Dispersion against concealed targets (DACTS) ..... | 1975      |

<sup>a</sup>Titles are informal ones. Except for CDEC 21.9, formal reports are not available from DDC.

Targets

Three types of silhouette targets are available for use on the test ranges: head-and-shoulders, kneeling, and standing targets. These 3-dimensional infantry targets\* are made of foam laminated to stamped aluminum. There are 64 targets in five arrays on the Alpha range, 49 targets in six arrays on the Bravo range, and 2 targets on each of two cars on the moving target range.

Target Raising and Lowering Mechanism

The CDEC target raising and lowering mechanism is the same M31 target holding mechanism that is used at IB. It was manufactured by the Rock Island Arsenal, Underwood Manufacturing Co., Hartford, Connecticut, and other companies for general use in the U.S. Army during the early 1960s. It operates on 110 volts AC current. It has been locally modified to raise a heavy target in winds up to 15 kn. Electrical filter devices were added to keep the mechanism from interfering with the other electrical components. A bracket has been fabricated locally to allow the height of the target to be adjusted and to provide armored protection

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\*These targets are called 3-dimensional because they are curved to roughly resemble a human torso, shoulders, and head.

for the hit sensor mounted at the base of the target. Target raising and lowering mechanisms modified for a 24-volt DC power source were installed on the carts for the moving target range.

#### Weapon-Signature Simulators

Most stationary targets have a weapon-signature simulator that can simulate the noise, flash, and muzzle blast of a rifle, automatic rifle, or machine gun, with rate of fire and burst size controlled by the computer program (see Figure F-4). The simulators are located within the redwood box that houses the target mechanism. The simulation is produced by the spark ignition of a propane-oxygen mixture. The propane and oxygen tanks are located alongside the box that houses the target. The simulators are designed to operate at a maximum rate of 500 simulated rounds per minute.

#### Target Computer Units (TCUs)

The TCU is an electronic control and signal-conditioning device located at each target emplacement. It processes signals to raise and lower the target and to fire the simulator, and it conditions hit and near-miss signals before they are transmitted to the computer van. The TCU contains a five-position switch to preset the gain of the miss-distance sensors to one of four calibers of ammunition. The gain is usually set for near misses scoring within two meters of the microphone for bullets.

#### Hit Sensor

A piezo-electric, crystal hit transducer is attached to the aluminum body of the target to detect hits and initiate the lowering of the target. The foam rubber padding bonded to the aluminum surface prevents ricochets from being scored as "lethal" hits and minimizes the vibration likely to cause the sensor to score multiple hits when only a single round has penetrated. The shock detected when the projectile passes through the target is converted into an electrical impulse that is transmitted to the computer van via the TCU to be recorded as a hit on the control

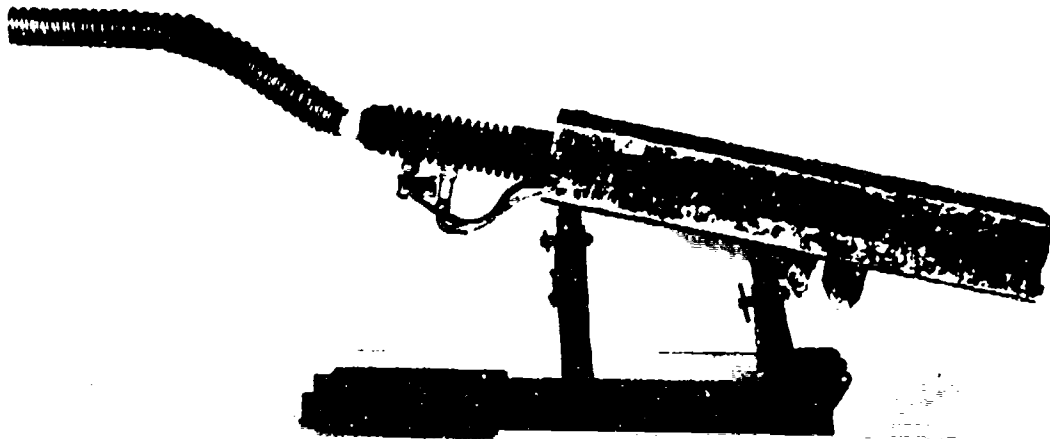


Figure P-4. Weapon-signature simulator (U.S. Army photograph).

console. When a hit is detected, the computer generates a signal that lowers the target.

#### Near-Miss Sensors

The acoustic near-miss sensor consists of an omnidirectional microphone available for use at each target position. The microphone is activated by the shock wave of a bullet passing within two meters of it.

The target components--raising and lowering mechanism, weapon-signature simulator, TCU, and near-miss sensor--are housed in a box armored with welded sheet steel and with a wooden cover (see Figure F-5).

#### Stationary Round Counters

An electronic round-counting device is installed at each stationary firing position so that all rounds fired can be sensed and recorded as a function of time. The stationary round-count system consists of a directional microphone connected to a signal-conditioning box. The microphone, mounted on the ground at one side of the weapon muzzle, senses the sound of the report when the weapon is fired. The generated signal is conditioned and transmitted to computer memory for recording on magnetic tape. By setting the gain volume for each sensor properly, the risk of counting rounds from nearby firers is reduced.

#### Portable Round Counters

A portable round-counting system consisting of a modified M16 rifle stock, a transmitter and power supply that fit in the M16's magazine pouch, and a helmet with a 14-inch whip antenna, provides the means for recording rounds fired as a function of time in moving situations. The portable round counter works only on the M16 rifle or on rifles that can be fitted with the M16's stock. The instrumented stock detects the rearward movement of the buffer group and generates a signal when the weapon is fired. The signal is then processed and transmitted to a radio receiver, which transmits the rounds fired as a function of time by firer to the computer van. The modified M16 rifle stock can be connected to a junction box at a fixed firing point so that round-count signals can be transmitted

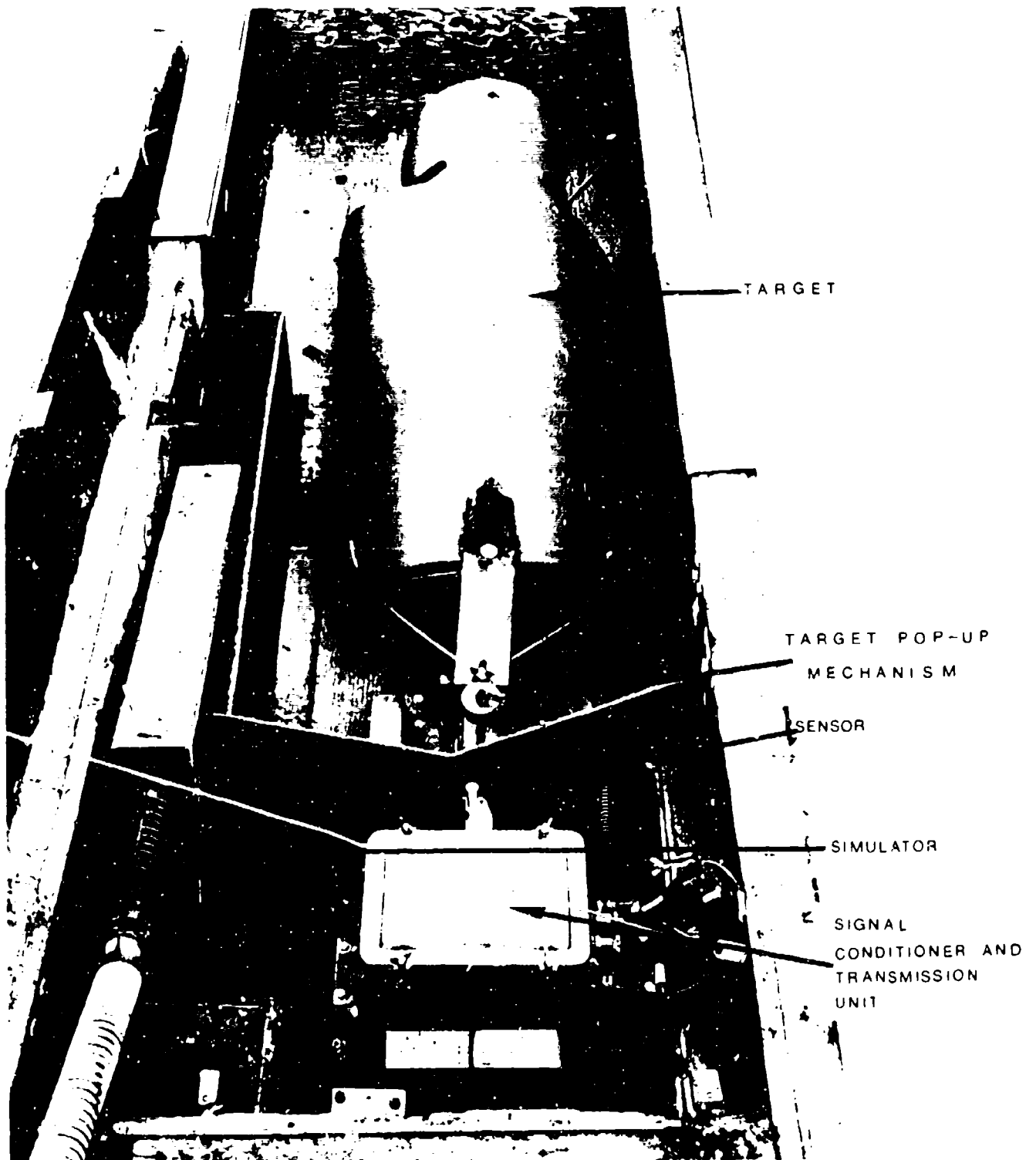


Figure F-5. Target components in armored target box (U.S. Army photograph).

by cable to the computer van. The portable round counter is illustrated in Figure F-6. The system is limited to line of sight, but since the portable round-count receiver is located with the computer vans on high ground at the rear of the ranges, this limitation is not serious.

The portable round-count receiver is a locally fabricated device that has 15 channels, each capable of monitoring a separate firer. The receiver operates on a carrier frequency of 148.020 to 150.740 MHz. Its output is wired to the adjacent computer van to be time-tagged and recorded.

#### Programming the Target Array

The raising and lowering of targets and the firing of the weapon-signature simulators are controlled from the computer van. The targets can be programmed to appear or reappear in any sequence for any selected duration. They can be programmed (1) to remain in view for a certain time, (2) to drop when hit, and (3) to respond to suppressive fire, i.e., projectile near misses, within a specified time interval. Individual targets can be controlled manually from the computer van for pretrial checkout. Control can be automatic via the computer program or direct by manual override, which can be used to raise or lower targets that fail to respond to the computer program.

In situations where targets are raised when the test squad crosses an event line, the program can be activated by a radio signal or by a visual signal from someone on the spot to an operator in the computer van as the firers move through the course.

#### Control and Recording Equipment

The control and recording equipment is housed in a mobile computer van. It consists of an SDS Model 910 computer, a magnetic tape unit, a teletype unit, a digital event activator, a digital event evaluator, and control console for monitoring up to 50 targets and their associated simulators. The digital event activator can command up to 102 contact closures to control the raising and lowering of targets, the firing of weapon-signature simulators, and a digital clock. The evaluator subsystem

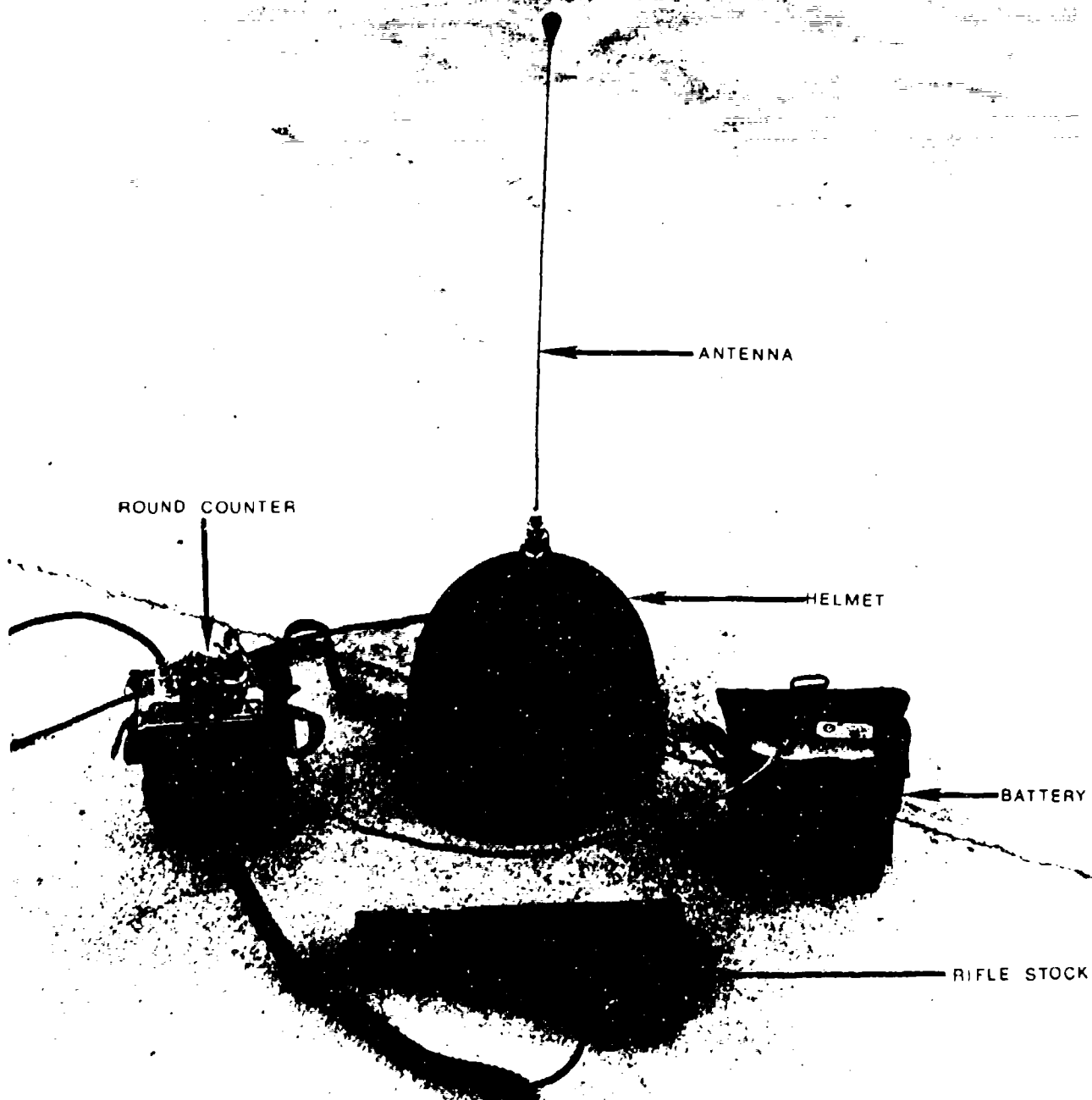


Figure F-6. Portable round counter for the M16 rifle (U.S. Army photograph).

can scan 384 input lines every 4 ms, detecting, storing, and processing signal changes under the program's control. Comparison of current input signals with results stored from the previous scan is the basis for detecting any change in status. Status changes are processed and recorded on magnetic tape. Each change can be summarized on a typed printout. Scanned input signals are classified into hits, near misses, target position, weapon simulator firing, and rounds fired.

The control console is placed in the van so that the console operators can view the firing situations from windows facing down-range. The console has five sections, from which five operators can each control and monitor ten targets and their weapon simulators. During calibration testing and warmup periods, manual controls are used. During experimental trials, the target arrays are driven by the computer program, with the possibility of manual override if necessary. Malfunctions of the target mechanism--raising and lowering devices or weapon-signature simulators--show up on the console by a lighted indicator. Manual controls are then activated to raise or lower the target or fire the simulator, as needed. Each console has ten sets of three push buttons. One push button fires a simulator as long as the button is depressed; the second raises or lowers a target when depressed; and the third reraises a target after it has been hit or suppressed.

#### Components of the Moving Target Range

The moving target range consists of two parallel aluminum tracks 600 ft long on which four-wheeled, aluminum target carts can be towed in either direction. Both carts are powered by a Volkswagen engine from a bunker by a draw-and-release cable. It is reported to be able to tow the cart along the track at up to 15 mph. The power unit has a hand-controlled accelerator and dial for regulating the speed of the cart. The cart and track are of a local design and fabrication.

Two modified M31A1 target raising and lowering mechanisms are installed on each cart. Modifications include a 24-volt DC battery system. The three-dimensional target bodies used on the Alpha and Bravo ranges are also used on this range. The target instrumentation consists of hit

counters and elapsed-time counters that indicate the total length of time the target was raised to the nearest tenth of a second. Both targets on one cart are raised and lowered simultaneously from the control bunker via an RF link. They are not programmed to fall when hit but remain up for a certain time, as ordered.

There are five foxholes in front of the moving target's berm at ranges of 100 to 300 yards. They are positioned so that the target's track makes an angle of  $45^{\circ}$  to  $60^{\circ}$  with the shooter's line of sight to the targets. None of the five firing positions is equipped with a round counter or other instrumentation.

#### Reliability of Instrumentation

During the approximately 10 years of operation of the CDEC small arms testing ranges, the reliability of the components has naturally varied with the amount of their use and care in their maintenance. Reliability, for example, that of an acoustic near-miss sensor, also depends on the attention given to calibration and checkout, on the age of the components, and on the weather conditions, e.g., rain or high humidity, in which the equipment is operated.

Tests have been made to assess the reliability of target raising and lowering mechanisms, the combined target and hit sensor for recording hits, the acoustic near-miss sensor, and both the stationary and portable round counters for their fidelity in counting the number of rounds fired. The tests have shown the instrumentation to be fairly reliable, but no current information is available. Nor are reliability data available for the SDS 910 computers. In 1974 the computer operated 1007 and 915 hours, respectively, on the Alpha and Bravo ranges. At 83 and 76 hours per month, respectively, that represents extensive use.

The officer in charge of the CDEC ranges estimated that each of the three ranges required 90 minutes of pretrial checkout daily to ensure proper operation, and longer if it was found necessary to replace a main component. If the ranges were shut down for six weeks, it would require about 20 working days to put the Alpha and Bravo ranges back in operation

and 5 days to restart trials on the moving target range.\*

Relocating any of the ranges would be a major undertaking. Only one target array of 14 targets has been moved during the ten years since the installation of the ranges at Hunter Liggett Military Reservation.\*\* Targets are not moved frequently because of the labor and the cost of rewiring (cabling) involved. In contrast, several new firing lines have been added to the ranges, e.g., five to Bravo range. A new firing line usually requires a single cable trench in front of the line, with junction boxes for each firing point and cabling to the nearest existing firing line for power and for linkage to the computer van. Though adding firing lines provides a variety of target distances for the firers, it may fail to provide situations to adequately test a weapon because of the artificiality of the terrain. It is too easy to detect targets before they are raised where the terrain has been burned out, shot off, or scarred by maintenance crews working on the targets.

#### Range Layouts

The layouts of Alpha and Bravo ranges are shown in Figures F-7 and F-8.

#### Cost

The CDEC Alpha and Bravo ranges were initially procured on a "sole source and best effort" basis from Del Mar Engineering Laboratories for \$2,253,263. This cost did not include (1) government-furnished equipment, e.g., M31A1 target mechanisms, or (2) installation, which, with minor exceptions, was done by Fort Ord post engineers and troop labor. The value of the labor is impossible to estimate, and in any case the cost

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\*The Officer-in-Charge, Live Fire Ranges, Instrumentation Support Group, CDEC, gave these estimates on 13 February 1975, based on 22 months of experience.

\*\*Display A-3 on Alpha range, which was used for the IRUS experiment, was moved about 75 meters south of its initial position. In the process, the array was reduced from 14 to 7 targets and redesignated Array 3. This array is not depicted on the Alpha range layout in Figure F-7 since its exact location is not known.

F-23

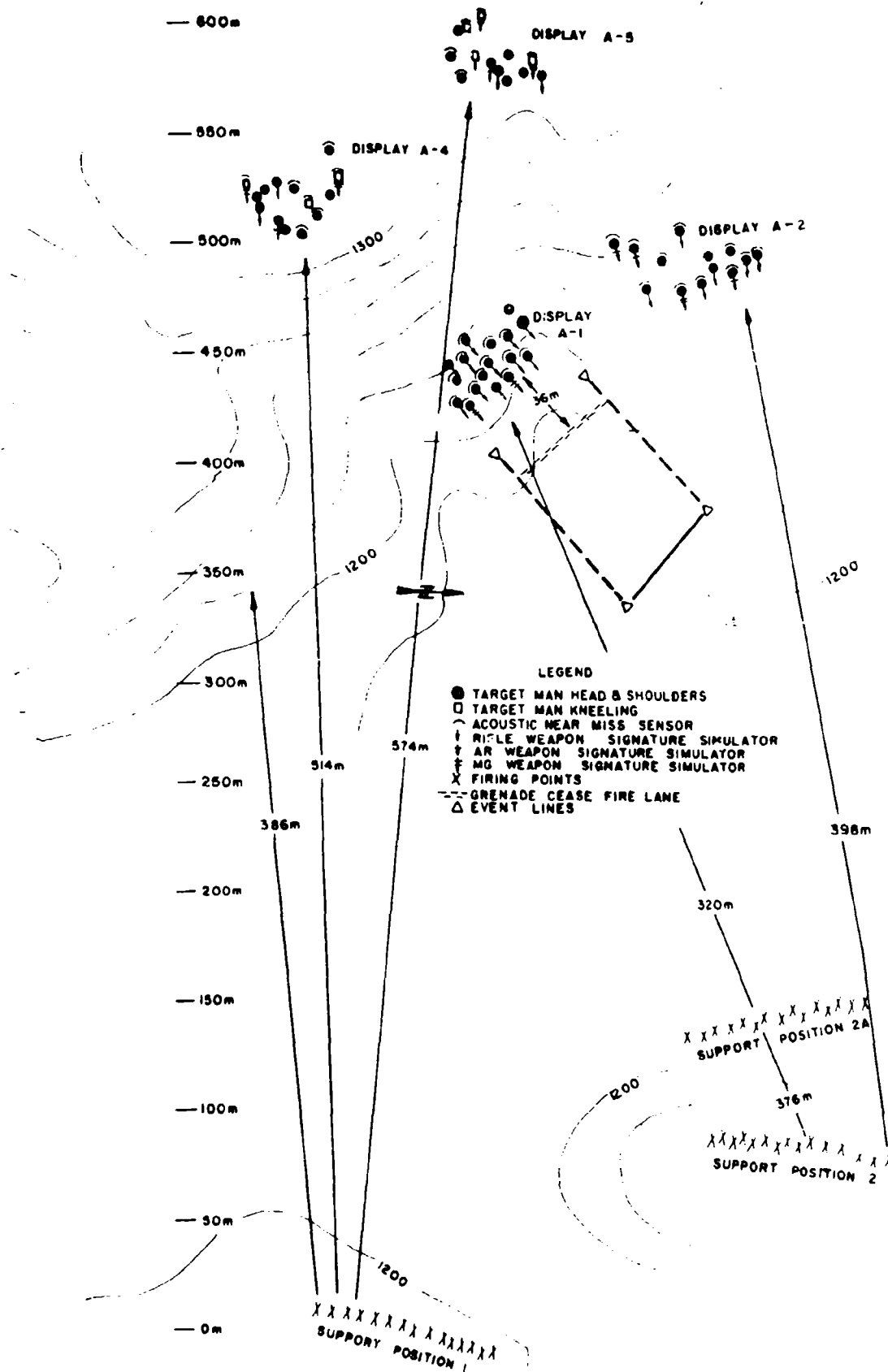


Figure F-7. Layout of Alpha Range, HLMR.

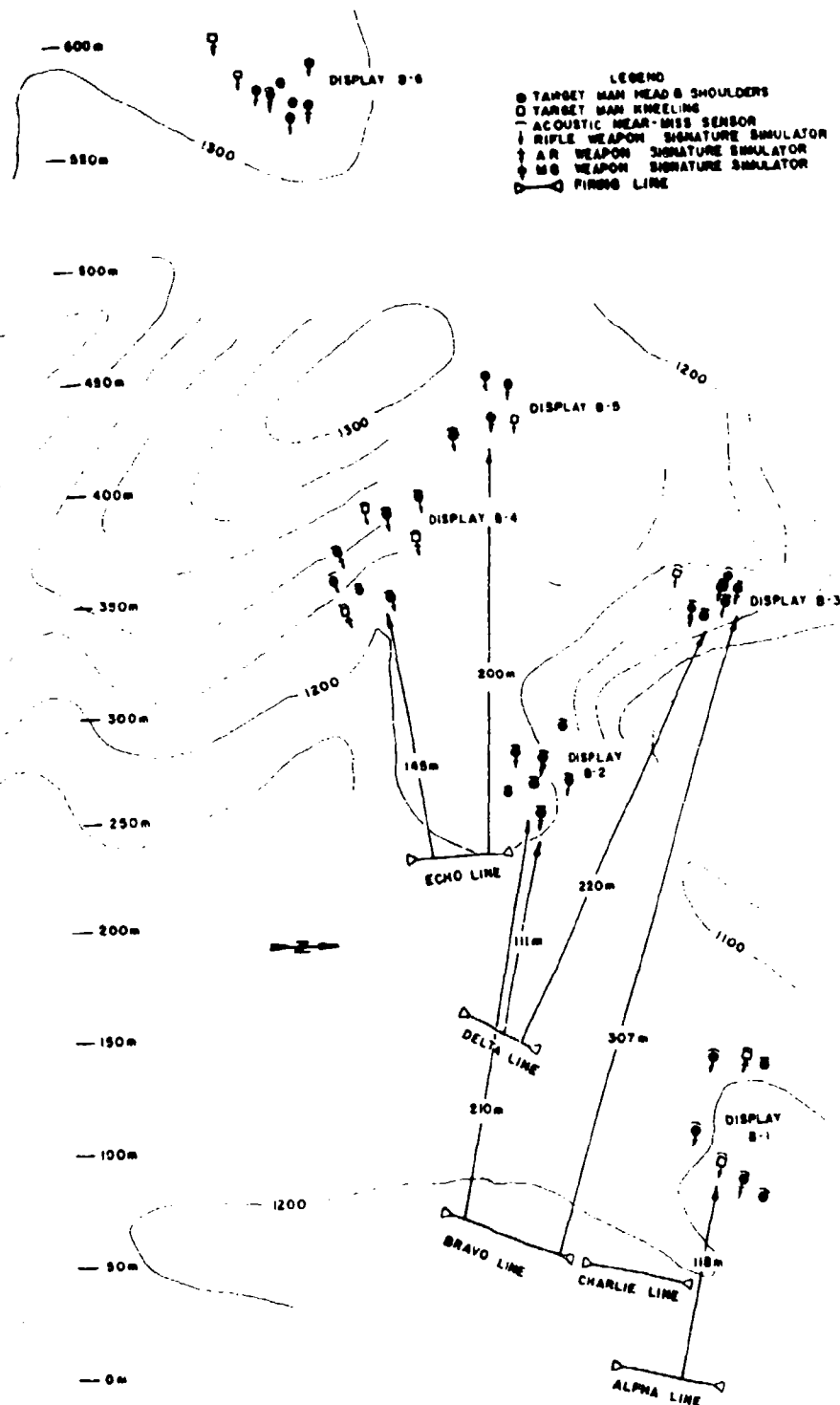


Figure F-8. Layout of Bravo Range, HLMR.

of installation varies from range to range depending on soil and other conditions. The contract did, however, cover unspecified "design costs" that were borne entirely by Del Mar. The cost of the moving target range could not be determined.

When they are being used, the CDEC ranges have a regularly assigned, full-time complement of soldiers supplemented by civilian contractors for technical and analytical support.\* The types of personnel involved are identified in Table F-5.

Table F-5

PERSONNEL DIRECTLY ASSIGNED TO CDEC RANGES  
WHEN IN OPERATION

| Range                   | Officers | Enlisted Personnel |          | Contractor Personnel |              |
|-------------------------|----------|--------------------|----------|----------------------|--------------|
|                         |          | Technician         | Operator | Technician           | Statistician |
| All (supervisor)        | 1        | -                  | -        | 1                    | -            |
| Alpha                   | -        | 1                  | 10       | 3                    | 1            |
| Bravo                   | -        | 1                  | 10       | 3                    | 1            |
| Moving target           | -        | -                  | 2        | 2                    | 1            |
| Total (38) <sup>a</sup> | 1        | 2                  | 23       | 9                    | 3            |

<sup>a</sup> Only when all three ranges are used concurrently.

The cost of replacing target bodies, plus the personnel costs, probably amount to \$2500/day.\*\* Maintenance and other operating and replacement costs were not determined and are not included in this estimate.

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\* Equipment maintenance is provided under contract by Bell Aerospace Corporation; scientific support is provided by Braddock, Dunn and McDonald.

\*\* Each target body is replaced after about 100 hits. Therefore, the \$2500/day estimate is based on 2-3 hits per target per run, 10 trials per day. This implies that 33 percent of the 49 targets are replaced daily, which amounts to \$1536 (16.17 targets x \$95); \$1536 + \$896 (estimated personnel costs) = \$2432.

The procurement cost of instrumentation components is shown in Table F-6.

### NEW RANGE EQUIPMENT

Besides assessing the small arms range complexes at CDEC and IB, a search was conducted to find and assess other range systems and components available for use on such ranges. In all, the products of about 30 companies were surveyed. Below are described two complete range systems-- the DART system, produced by the Australasian Training Aids Pty., Ltd., Albury, N. S. W., Australia, and the SAAB Target System, produced by SAAB-Scania, Jonkoping, Sweden--and then individual component equipment available from various companies.

First, to make meaningful what capabilities the new target systems and components might be able to provide to small arms testing ranges, it is instructive to compare the current capabilities of CDEC and IB in target instrumentation and the capacity to handle test firers. This is done in Table F-7.

### DART Target System

#### Instrumentation

The DART Target System is manufactured by Australasian Training Aids Pty., Ltd. The system consists of a hit-sensitive panel or silhouette, a raising and lowering mechanism, battery or power pack, and weapon-signature simulator. Targets are manually controlled by an operator using a control panel, either through a wire or radio control link. An integrated control panel/transmitter system, which is portable, can be purchased to control up to 10 targets. The various target components are described below.

Raising and lowering mechanisms. The target raising and lowering unit is equipped to hold one target body each and consists of a water-proof, cast aluminum box housing a gear box and motor along with the electrical control module. If AC commercial power is not used, power is supplied by a 12-volt, rechargeable, lead acid battery, which will

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Table F-6

## PROCUREMENT COSTS OF CDEC RANGE COMPONENTS

| Component                                                  | Cost per Unit         |
|------------------------------------------------------------|-----------------------|
| Target raising and lowering mechanism M31A1 .....          | \$ 400                |
| Target silhouette without hit sensor                       |                       |
| 2-dimensional target:                                      |                       |
| head and shoulders .....                                   | 48                    |
| kneeling .....                                             | 62                    |
| standing .....                                             | 81                    |
| 3-dimensional target:                                      |                       |
| head and shoulders .....                                   | 65 <sup>a</sup>       |
| kneeling .....                                             | 95 <sup>b</sup>       |
| standing .....                                             | 110 <sup>a</sup>      |
| Hit sensor with cable .....                                | 120 <sup>c</sup>      |
| Acoustic near-miss sensor .....                            | 172                   |
| Hit-counting halo for sensing near misses with mount ..... | 1080                  |
| Target computer unit (TCU) .....                           | 900                   |
| "A" cards for TCU (hit counting) .....                     | 1195                  |
| "B" cards for TCU (miss measuring) .....                   | 940                   |
| "C" cards for TCU (hit counting for halo) .....            | 355                   |
| Stationary round counter .....                             | 1314                  |
| Portable round counter (for one soldier) .....             | 473                   |
| Helmet modification                                        | \$ 12.50 <sup>d</sup> |
| Transmitter                                                | \$ 40.00 <sup>e</sup> |
| Power unit                                                 | \$ 20.00 <sup>d</sup> |
| Modified M16 rifle stock                                   | \$400.00 <sup>d</sup> |
| Portable rounds fired indicator receiver and rack .....    | 2100 <sup>b</sup>     |

NOTE: Unless otherwise footnoted, costs are taken from CDEC, Instrumentation Support Group, Memorandum for Record, "Historical Brief on Association with Del Mar Engineering Associates," ISG-POR-PFR (Ft. Ord, CA, 14 February 1967). Where necessary, costs were adjusted to 1974 replacement prices.

<sup>a</sup>"Purchase Request and Commitment for: Three-Dimensional Targets," P/N: 10492-501 and P/N: 10490-501 from CDEC Contract Officer to Del Mar Engineering Laboratories, 7 June 1974.

<sup>b</sup>Provided by Officer-in-Charge, Live Fire Ranges, Instrumentation Support Group, CDEC, 19 February 1975.

<sup>c</sup>"Purchase Request and Commitment for: Hit Transducer," P/N: 10419 from CDEC Contract Officer to Del Mar Engineering Laboratories, 7 June 1974.

<sup>d</sup>Provided by Don Werner, Braddock, Dunn and McDonald, Instrumentation Support Section, HLMR, 13 February 1975.

<sup>e</sup>Estimate.

Table F-7  
COMPARISON OF CURRENT IB AND CDEC RANGES IN TARGET INSTRUMENTATION  
AND CAPACITY TO HANDLE TEST FIRERS

| Situation (or Range)                                                              | Number of Simultaneous Firers |          | Cycle Time <sup>a</sup> (min) |          | Total Number of Targets |          | Number of Hit Sensors |          | Number of Near-Miss Sensors |          | Total Number of Simulators |          | Estimated Maximum Capacity (firers/day) |            |
|-----------------------------------------------------------------------------------|-------------------------------|----------|-------------------------------|----------|-------------------------|----------|-----------------------|----------|-----------------------------|----------|----------------------------|----------|-----------------------------------------|------------|
|                                                                                   | IB                            | CDEC     | IB                            | CDEC     | IB                      | CDEC     | IB                    | CDEC     | IB                          | CDEC     | IB                         | CDEC     | IB                                      | CDEC       |
| Assault                                                                           | 4                             | 9        | 8                             | 15       | 11                      | 17       | 11                    | 17       | 3                           | 17       | 0                          | 15       | 225                                     | 228        |
| Firing at the same targets from different firing points (fire and movement phase) | 4                             | 12       | 15                            | 30       | 11                      | 28       | 11                    | 28       | 3                           | 28       | 3                          | 21       | 128                                     | 192        |
| Quick-fire                                                                        | 1                             | NA       | 15                            | NA       | 25                      | NA       | 25                    | NA       | 25                          | NA       | 14                         | NA       | 32                                      | NA         |
| Base of Fire: for assault for advance                                             | 10<br>NA                      | 15<br>15 | 12 <sup>b</sup><br>NA         | 15<br>15 | 12<br>NA                | 30<br>28 | 12<br>NA              | 30<br>28 | 3<br>NA                     | 30<br>28 | 3<br>NA                    | 25<br>23 | 400<br>NA                               | 480<br>480 |
| Day defense                                                                       | 10                            | 12       | 15 <sup>b</sup>               | 15       | 66                      | 28       | 66                    | 28       | 16                          | 28       | 6                          | 23       | 240                                     | 384        |
| Night defense                                                                     | 4                             | NA       | 15 <sup>b</sup>               | NA       | 57                      | NA       | 44                    | NA       | --                          | NA       | 6                          | NA       | 128                                     | NA         |

<sup>a</sup> Includes the length of the trial, the time to clear the range, and the time to test the instrumentation.

<sup>b</sup> Approximate.

allow over 4000 cycles, i.e., 4000 up and 4000 down actuations, before recharging is necessary.

Normally, the mechanism is controlled by a radio transmitter using the hit-and-fall method, but by continuously depressing the "Up" button, any target can be made to stay up, even when hit. Another form of control is furnished by a manual control and counter unit, which also can override the fall-when-hit mode and record hits on a counter mounted on the target mechanism.

The target holder is mounted on the final drive shaft and can be adjusted to accept flat targets 1/16-1/2-inch thick. It is designed to operate with the full range of targets currently used by NATO and SEATO countries.

Moving target carriers. A carrier capable of holding three target raising and lowering mechanisms is available. No operating specifications are provided. Brochures show the carrier operating on a two-rail, ground-mounted track similar to a railroad track. They do not indicate whether the carrier drive is ground-mounted with a pulley system or is self-propelled. Speeds are listed as equivalent to those of a walking and a running man.

Weapon-signature simulator. A 24-round, single-shot small arms simulator is available with the raising and lowering mechanism. It simulates noise, flash, and dust. Cartridges are reloaded into the simulator and are fired with the command to raise the target.

The simulator consists of a block made of specially hardened steel, drilled to accept twenty-four #33 commercial or marine electric detonators. The block is cable-connected to the mechanism via a 26-pin plug, and the leads of the electrical detonators are connected via a terminal strip. When the "Detonate" command is sent from the transmitter, the effect of a rifle shot is produced, with accompanying noise, flash, smoke, and dust.

Programmed target array. The targets are raised one time by an operator, using a control transmitter, who observes the firing of the test subjects. The targets can be set to drop when hit or to remain in view by continually giving the "Up" command. The running-man targets are also started normally from the control console.

Besides the control panel, the programmer has a transmitter and receiver system. The individual receivers are located at each target position.

The transmitter is powered by three internal, 6-volt cells made of nickel cadmium, which are recharged by a special constant current charger. The transmitter emits a single, radio frequency carrier wave that can be modulated by any of 10 audio channels to keep the target up. A common "Down" button causes all targets to drop simultaneously. A "Detonate" button, when pressed with a target "Up" button, will cause the chosen target to fire a simulated retaliatory or offensive shot.

The receiver consists of a waterproof, cast aluminum box that, although removable, is normally clamped to the mechanism-carrying frame. The receiver is connected by one cable to the mechanism via connectors, and is powered from the main mechanism battery.

Each mechanism requires one receiver, which is identified by number, namely channels 1 to 10, corresponding to the respective "Up" button numbers on the transmitter. The receiver is a conventional superheterodyne type operating in the 27-33 MHz band.

Hit sensors. The hit sensor appears to be a vibration-sensitive element located at the base of an almost rectangular, kneeling-man (type E) polyethylene target. The sensor activates a hit counter located on the target mechanism. Each target will sustain several hundred hits before needing replacement. The vibration-sensitive switch is connected by cable to the target raising and lowering mechanism. The detection of a hit either causes the target to fall or to register a hit on the counter, depending on the operation mode selected.

Night-firing attachment. The night-firing device consists of a small, waterproof aluminum box surmounted by a plastic dome. A light inside the dome illuminates the target when a button is pushed on the control/transmitter panel. When the target is hit, a red light shows briefly to inform the firer. The light is shielded to prevent illumination of the surrounding area.

Other instrumentation. The system has no near-miss sensor or round-counting system. Nor is there a means of producing hard-copy reports of either target presentations or resulting hit data.

Reliability

No data are available on the DART system's reliability. However, spare parts can be bought with the basic system, and malfunctioning components can be quickly changed by range crews.

Cost

The Marine Corps has bought the DART system for two of its installations.\* Judging from procurement plans, the cost of one target set is about \$2500.

SAAB Small Arms Training System

No technical reports of the SAAB system are available. The description below is based on information provided by the Detroit Bullet Trap Company, Schaumburg, Illinois. The firm is licensed to sell the SAAB system in the United States and is currently negotiating for the rights to manufacture the entire system in this country.\*\*

Instrumentation

The target system consists basically of a raising and lowering mechanism with a target holder capable of holding all sizes and types of target bodies. The mechanism can be purchased with several optional equipment items to produce the desired configuration. They include direct power hook-up, power pack, night-firing illuminator, weapon-signature simulator, wire or radio command link, hit counter, and control console.

Raising and lowering mechanism. The raising and lowering mechanism is equipped with a target holder capable of holding any type of small arms target. It consists of a waterproof, sheet-metal box galvanized for weather protection. It contains an electromechanical gear drive that

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\*U.S. Marine Corps, Deputy Chief of Staff, Installation and Logistics, to Naval Training Equipment Center, Commanding Officer, Orlando, Florida, "Marine Corps Procurement Request," 27 June 1974; Naval Training Equipment Center, Commanding Officer, "List of Equipment Required for Commander General, Marine Corps Recruit Depot, Parris Island," (cost included), letter N3203: GDG, 22 May 1973.

\*\*Information provided by Mr. Joseph Nikoden, Marketing Representative, Detroit Bullet Trap Company.

operates on 14 volts DC provided either by a nickel-cadmium power pack or commercial power via reducer-converter. A special air-powered raising and lowering mechanism is also available. With the power pack the unit is capable of 3000 up-down cycles between charges.

The mechanism will operate in several modes: drop when hit, stay up for a preset time period, illuminate a night-firing light, or fire a simulator when raised. Control is by a wire or radio link.

Weapon-signature simulator. The system uses the SAAB "gun," a machine gun-shaped device that produces flash and noise by means of a mixture of oxygen and propane gas ignited by a spark plug. The simulators used at CDEC and IB are similar. The SAAB simulator will fire either single shots or bursts, and several thousand "shots" can be fired before the storage tanks must be recharged. The device is coupled with the raising and lowering mechanism for control.

Programmed target array. Several types of programs are available. Push-button tower or vehicle-mounted units are normally used on training ranges and can be configured for any number of targets. The control link can be either wire or radio. Small computers (PDP 8, Digital Equipment Corporation) have also been used as target controllers.

Hit sensor. The hit sensor is a special vibration-sensitive element located at the base of an aluminum target. Other types of hit-sensitive target bodies (like those used at CDEC and IB) may also be used with the target mechanism. The vibration-sensitive element is connected by cable to the target mechanism. Hits may be registered on a counter attached to the target or transmitted over wire to the recording device.

Night-firing attachment. On command, the night-firing device illuminates the target briefly. It is housed in a waterproof, sheet-metal box with a clear plastic cover. Power supply is from the target.

### Reliability

No data are available on the reliability of the SAAB system's instrumentation.

### Cost

No cost data are available.

### Individual Range Components Available

The various instrumentation components described below are available or have been used on test and training ranges. Some of these components were identified in the body of this report as components of existing ranges. Cross reference is made to their descriptions.

### Target Raising and Lowering Mechanisms

The standard M31A<sup>1</sup> and M30 mechanisms have been manufactured by several firms under the auspices of the Naval Training Devices Center.\* Joannell Engineering Laboratories, producer of the M30 mechanism (\$400 each) has designed an improved mechanism that has not been built in quantity. The new unit is lighter and simpler in design. It will hold flat or slightly curved target bodies (kneeling-man) of varying thickness. The operating principle is identical to the M30 mechanism. Estimated cost of the new mechanism is \$350 each.

### Moving Targets

Four companies were found that manufacture or have manufactured moving targets.

The IB running-man target system was manufactured by the Saratoga Conveyor Company, Atlanta, Georgia. Designated MTV-200, it consists of a ground-mounted pulley drive unit, 20-ft track sections bolted together in lengths of 80 to 200 ft, and a target-carrying cart. The system operates on 220 volts AC with a 1-hp, 3-phase, 208-V, AC reversing-brake motor coupled directly to a V-pulley. In a speed-reducing arrangement, the V-belt couples the drive motor to an axle, which drives an endless cable over an idler wheel at the opposite end of the track. Speeds of 5-15 mph can be obtained by substituting pulleys of various sizes.

The computer, which acts as a controller, sends a start signal to the drive unit; the start signal closes a power relay, which starts the unit in motion. As the carrier passes over a prepositioned friction bar (6 ft long), a small rubber wheel brings the target to an upright position.

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\* U.S. Navy Training Devices Center, NAVSO Pamphlet 3108 (Orlando, FL, December 1967).

The target is held in this position by a solenoid until the cart passes over a prepositioned switch on the target or until it is hit. Then, the solenoid releases the target, which by gravity drops to its resting position. The cart continues along the track until the limit switch is triggered. It is then braked to a halt by the drive unit, which then reverses itself and automatically returns the target carrier to its starting position. These units have been in operation for four years. Periodic maintenance consists of adjusting the cable tension and replacing pulleys. The 1/4-inch steel cable tends to pick up dirt, which causes wear on the pulley. Hit data are transmitted to the computer via a radio link manufactured by California Avionics Laboratory, Inc.

Cost of the MTV-200, with 100 ft of track, is \$4000 to \$4500. The track may be installed on any fairly flat terrain. The target will not negotiate turns.

Two other moving target systems, manufactured by Aircraft Armaments, Inc. (AAI), Cockeysville, Maryland, and Joannell Engineering Laboratories, Livingston, New Jersey, were tested during the mid-1960s by the IB. The AAI system consisted of a self-propelled carrier, a pneumatic lifting mechanism, and a concrete runway with a center guide rail. Commands, current, and data collection were transmitted via the guide rail. The system operated on 200 volts AC on a circular track (one forward speed of 4 mph), powered by a 1-hp motor. The IB found the unit unsuitable because (1) the carrier was so heavy that a wrecker had to be used to emplace it, (2) the 4-ft height of the carrier required an unrealistic protective earth berm that impaired the realism desired for the range, (3) installation cost was \$4 per linear foot for the guide rail plus installation of a concrete pad, and procurement cost was \$8000 per target carrier.\*

The Joannell unit had the same basic components but operated on a 24-volt DC current using a 1-hp motor. The target-lifting mechanism was gear-driven; two rails were used to guide the target. As with the AAI target, the units were heavy and required a protective earth berm.

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\*USAIB, Quick-Fire Experiment I, p. 83.

Joanell has manufactured an improved version that is being used on the training range at Camp Pendleton, California. The cost of this unit was \$6000. Installation cost included a concrete runway. The unit can operate on either circular or straight courses at a single speed of 4 mph forward or reverse.

The fourth moving target system is manufactured by the Detroit Bullet Trap Company and consists of a ground-mounted drive unit, a track system of 16-ft sections that can be arranged in any length to 500 ft, and an 8-wheeled cart that rides on the track. It operates on a V-pulley drive with a 1-hp, 200-volt AC motor and an endless cable. The carrier can be fitted with up to three SAAB raising and lowering mechanisms. Carrier speed can be varied up to 9 ft/sec. The system can be operated in either direction. It will not negotiate curves. The same company has produced another model that uses the same drive equipment but will operate on a loop or circular track. The track is galvanized for weather protection.

The CDEC moving target system, previously described, was fabricated in-house and the components bought by contract.

#### Weapon-Signature Simulators

The most commonly used small arms simulator or weapon-signature device is the SAAB machine gun simulator, which operates on a mixture of oxygen and propane gas ignited by a spark plug. The units can be fired remotely by wire and will fire single shots or short bursts. The system operates from a 24-volt DC power pack or, using a current-reduction converter, from commercial power. The rate of fire in the automatic mode is approximately 550 rounds per minute. These simulators were produced under the auspices of the Naval Training Devices Center. They cost approximately \$1200 each with pressure hoses and storage tanks.

The DART system uses a device that holds up to 24 blasting caps. As each is detonated, a single rifle shot is electrically simulated. No information is available on the cost of this unit when purchased separately.

Joanell Laboratories claims to have an improved model of the SAAB gun that can fire at a maximum rate of 3000 rounds per minute. Cost depends on the quantity ordered. The utility of this firing rate is doubtful.

### Near-Miss Sensors

Several types of near-miss sensors have been developed and used with varying degrees of success. The two most common and least expensive systems both utilize the ballistic shock wave of the passing projectile. One system measures the amplitude or loudness of the sound, while the second system measures the time differential of the arrival of the shock wave at various points. Both use a pressure transducer (microphone) as the sensing element. These systems are described in Chapter V.

CDEC uses the amplitude-measuring system, produced under the brand name Acousticscore by Del Mar Engineering Laboratories, Los Angeles. The cost of a single unit is estimated at \$1500. IB uses the time-differential sensing device. The cost is \$240 for the four microphones, plus four signal-conditioning units (\$250), plus a recording device. The total cost of a single system is thus \$490 plus a display unit.

Acubar, Inc., Overton, Pennsylvania, has developed a variation of the time-differential system. Two metal rods (16-40 ft long) are placed near the target, usually at 90° from each other. As the shock wave strikes the rods, they pick up the sound and transmit it to a sensor at each end of each rod. The time of arrival at each point is measured and used to calculate the point at which the shock wave first struck the rod; this is the x,y coordinate. The pulses are fed through signal-conditioning circuits into an electronic counter or computer. The system is claimed to be accurate to 1/10 inch under ideal conditions,\* the weapon in a fixed location. This system is also affected by angle of penetration. The cost of a single system with digital display readout is about \$13,000, installed. It counts 6000 rounds per minute, with 9100 achievable with special instrumentation.

The Acubar system has been installed at the following installations, almost entirely on indoor test ranges: Eglin Air Force Base, Aberdeen Proving Ground, Rock Island Arsenal, Lake City Arsenal, Twin Cities Arsenal, and Frankfort Arsenal. The systems at Twin Cities and Frankfort use a

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\* According to George Rohrbaugh, Acubar, Inc.

PDP 8 computer (Digital Equipment Corporation) as the data collection device.

Aircraft Armaments, Inc. (AAI), Cockeysville, Maryland, has developed a "sky screen," consisting of a high-intensity lamp located near the base of the target that shines directly upward but does not illuminate the target in any way. As projectiles pass through the screen, light is reflected downward and picked up by several photo cells. The result is an x,y coordinate of the point of penetration. No cost data are available and no systems have been installed. The system requires no calibration and is not dependent on a precise angle of penetration.

The Elmer Corp., Wilton, Connecticut, has developed an improved sky screen consisting of a laser illuminator and two laser scanners on either side of the target base. The scanners sense the projectile and record the angle at which the scanner was aimed at the time of contact. The intersection angles of the two scanners determine the point of impact. No cost information is available for this system.

At least one French firm is marketing acoustic near-miss scorers; SFENA builds the acoustic scorers MAE-12B and MAE-14. Air Target, Ltd., in Sweden, is reported to make the AS100 acoustic scorer; SAAB-Bulow of Sweden markets the BT-27 and BT-14 acoustic sensors. These all appear to be air-to-ground strafing scorers. No information on them could be found.

#### Round-Counting Systems

Three round-counting systems are currently in use on the two major operational testing ranges. No other commercial systems were found.

Two of these systems were developed in-house at CDEC and IB and have been described earlier in this appendix. The third is a portable, helmet-mounted system that permits the firer complete freedom of movement. It is used at the IB during the fire and movement and assault phases of testing on the attack range. It is the only commercially available system and costs \$550 per helmet unit and \$6000 per eight-channel receiver. A display counting device or computer must be linked to the receiver for data recording. The system is manufactured by California Avionics Laboratory, Palo Alto, California.

Table F-8 lists the companies surveyed and their main products related to small arms testing and training.

Other Instrumentation

Besides what already exists on the CDEC and IB ranges, or what has been described immediately above, no new target programmers, cable networks, camera recording systems, or other ancillary instrumentation have been reported.

Table F-8

COMPANIES PRODUCING EQUIPMENT FOR SMALL ARMS  
TESTING AND TRAINING

| Company                                                               | Product                                                                                                                        |
|-----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------|
| Aircraft Armaments, Inc.<br>Cockeysville, Maryland                    | Sky screen, miss-distance indicator,<br>moving targets                                                                         |
| ABA Industries, Inc.<br>Pinellas Park, Florida                        | Raising and lowering mechanisms<br>for tank targets                                                                            |
| Acubar, Inc.<br>Overton, Pennsylvania                                 | Acubar miss-distance indicator                                                                                                 |
| Air Target, Ltd.<br>Stockholm, Sweden                                 | Acoustic scorer                                                                                                                |
| Australasian Training Aids<br>Pty., Ltd.<br>Albury, N.S.W., Australia | Complete small arms training range<br>(DART system)                                                                            |
| Babcock Electronics Corp.<br>Costa Mesa, California                   | Automated target system<br>Radar miss-distance system                                                                          |
| California Avionics Laboratory,<br>Inc.<br>Palo Alto, California      | Helmet-mounted round counter<br>Moving target data units<br>Range-computer interface systems<br>Target program-control systems |
| Celesco Industries, Inc.<br>Costa Mesa, California                    | Air-to-ground and bomb-scoring<br>ranges                                                                                       |
| Del Mar Engineering Laboratories<br>Los Angeles, California           | Complete range system (CDEC)<br>Acousticscore                                                                                  |
| Detroit Bullet Trap Co.<br>Schaumburg, Illinois                       | Representative, SAAB complete<br>training system<br>Moving target mechanism                                                    |
| Digital Equipment Corp.<br>Maynard, Massachusetts                     | Range-computer interface equipment,<br>computers                                                                               |
| Ecko Instruments, Ltd.<br>Southend-on-Sea, Essex<br>Great Britain     | Radioactive miss-distance scorer                                                                                               |
| Elmer Corp.<br>Wilton, Connecticut                                    | Laser miss-distance indicator                                                                                                  |

Table F-8 (Continued)

| Company                                                                                            | Product                                                                                     |
|----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------|
| EMR, Inc.<br>Sarasota, Florida                                                                     | SIMFIRE non-live fire tank vs. tank system                                                  |
| Essex Corp.<br>Alexandria, Virginia                                                                | Human factors analysis and independent instrumentation<br>Evaluation for small arms testing |
| A. Frederick Flender Co.<br>Bucholdt, West Germany                                                 | Moving target drive systems                                                                 |
| Jocanell Engineering Laboratories<br>Livingston, New Jersey                                        | Hit-sensitive target material, moving targets, raising and lowering mechanisms              |
| Instrumentsfabriks AB Lyth<br>Stockholm, Sweden                                                    | Air-to-air scorer                                                                           |
| Mellonics Division, Litton Systems, Inc.<br>Sunnyvale, California                                  | Range-control software                                                                      |
| RAI Research Corp.<br>Hauppauge, New York                                                          | Representative, DART complete training system                                               |
| REALTRAIN<br>Chicago, Illinois                                                                     | Simulated live fire training system, tank vs. tank laser system                             |
| SAAB-Bulow<br>Linkoping, Sweden                                                                    | Air-to-ground acoustic scorers                                                              |
| SAAB-Scania<br>Jonkoping, Sweden                                                                   | Ground target system                                                                        |
| Sanders Associates<br>Boston, Massachusetts                                                        | Radar miss-distance scorer                                                                  |
| Saratoga Conveyor Company<br>Atlanta, Georgia                                                      | Moving man and tank target mechanisms, stationary tank target mechanism                     |
| Societe Francaise d'Equipements pour la Navigation Aerienne (SFENA)<br>Velizy-Villacoublay, France | Acoustic scorer                                                                             |

Table F-8 (Continued)

| Company                                              | Product                                                        |
|------------------------------------------------------|----------------------------------------------------------------|
| H.R.B. Singer<br>Baltimore, Maryland                 | Developer of Acubar but no longer<br>producing range equipment |
| System Consultants, Inc.<br>Jerico, New York         | Ammunition test services                                       |
| Underwood Manufacturing Co.<br>Hartford, Connecticut | Pop-up target mechanism                                        |
| Wood Ivy, Inc.<br>Alexandria, Virginia               | Moving-man target                                              |
| Xerox Data Systems<br>El Segundo, California         | CDEC range computers                                           |

**Appendix G**

**SAMPLE DECISION MEMORANDA FROM THE CDEC-SAWS PROJECT**

MARINE CORPS LIAISON OFFICER  
USACDC EXPERIMENTATION COMMAND  
Ft Ord, California 93941

CDEC-LO

18 October 1965

MEMORANDUM FOR RECORD

SUBJECT: Best Firing Technique Meeting of 15 October 1965

1. A meeting on best firing technique commenced at 1700 on 15 October, attended by the Board.

2. Technique of Fire for Approach-to-Contact Phase.

a. The Team Chief raised the question of our purpose in the design of the approach-to-contact situation on Range B. The original plan for this series of sub-situations was to examine the composite pointing characteristics of candidate weapons at typical firing distance for this mode of combat. There was a lengthy discussion which arrived at the consensus that different weapon "holding or pointing" techniques were applied to targets as a function of their range and number of targets that appear (urgency).

b. The Project Scientist reported he had planned the following exploratory firing trial sequence:

(1) Stoner rifle with 2-round burst

- (a) Shoulder aimed
- (b) Shoulder pointing
- (c) Under arm
- (d) Shoulder aimed
- (e) Shoulder pointing
- (f) Underarm without sling

(2) M-14 rifle

- (a) Shoulder aimed in 2-round burst
- (b) Shoulder aimed in semi-automatic fire
- (c) Shoulder aimed in 2-round burst

c. The Project Scientist continued to express concern about some of the short target exposure times in this situation. We concluded that the present command program was tentatively acceptable for target exposure, but it would be examined in the light of experience gained

with two new squads not previously exposed to this range. Our "exploratory firing" crew will continue the above series by the following trial sequence:

(1) Pointing (in a variety of weapon holding positions to meet the stress of each event conditioned by the distance to the target) in 2-round burst.

(2) Pointing in semi-automatic

(3) Pointing in 2-round burst

(4) Shoulder pointing 2-round burst

(5) Shoulder pointing semi-automatic

(6) Shoulder pointing 2-round burst

(7) Underarm 2-round burst

d. The Project Scientist then presented the initial exploratory firing data collected on the approach-to-contact situation of Range B on 11 October 1965. A total of 42 targets are included in this situation, with 10 targets being included in the ambush event. Data from four trials using the M-14 armed squad are shown in the table below:

TRIAL DATA FOR M-14 SQUAD, APPROACH-TO-CONTACT SITUATION

| Trial | Time | Technique of Fire             | Targets Hit | Total Hits | Targets Hit in Ambush | Total Ambush Exposure Time (min) <sup>a</sup> |
|-------|------|-------------------------------|-------------|------------|-----------------------|-----------------------------------------------|
| 1     | 0800 | Shoulder aim, 2-rd burst      | 21          | 24         | 5 <sup>b</sup>        | 0.53 <sup>b</sup>                             |
| 2     | 1100 | Shoulder pointing, 2-rd burst | 25          | 49         | 7                     | 0.39                                          |
| 3     | 1330 | "Low" underarm in 2-rd burst  | 19          | 25         | 5 <sup>b</sup>        | 0.59 <sup>b</sup>                             |
| 4     | 1530 | Shoulder aim, semi-automatic  | 32          | 55         | 10 <sup>c</sup>       | 0.23 <sup>c</sup>                             |

<sup>a</sup>Maximum exposure time for all targets on ambush situation is 0.70 minutes.

<sup>b</sup>Probably the most typical of shooter unexposed to this combat situation. Even so our exploratory firers are more experienced than the normal player squad.

<sup>c</sup>Unrealistic performance reflecting strong learning (that would be expected). These results are probably not suitable for a comparison against earlier trials.

USACDC EXPERIMENTATION COMMAND  
Ft Ord, California 93941

CDEC-LO

20 October 1965

## MEMORANDUM FOR RECORD

SUBJECT: Best Firing Technique Meeting of 19 October 1965

1. A meeting on best firing technique commenced at 1930 on 19 October, attended by the Board.

2. The decision that common firing techniques for machineguns would be applied, where possible, to both machineguns in the rifle squad and machinegun squad was reviewed. The following data were presented on the M-60 machinegun fired on the defensive situation.

M-60 MACHINEGUN FIRED DURING DAYTIME ON RANGE C

| <u>Date</u>        | <u>Time</u> | <u>Squad</u> | <u>Burst<br/>Size<br/>(rd)</u> | <u>Ammo<br/>Used</u> | <u>Targets<br/>Hit</u> | <u>Total<br/>Hits</u> | <u>Cum. Exp.<br/>Time</u> | <u>Ammo<br/>Consumed</u> |
|--------------------|-------------|--------------|--------------------------------|----------------------|------------------------|-----------------------|---------------------------|--------------------------|
| 7 Oct              | 0800        | A            | 6                              | ball                 | 37                     | 62                    | 7.36                      | 767                      |
| 7 Oct              | 0900        | B            | 6                              | ball                 | 32                     | 54                    | 9.47                      | 573                      |
| 7 Oct              | 1000        | A            | 6                              | ball                 | 33                     | 53                    | 8.16                      | 1200                     |
| 7 Oct              | 1100        | B            | 6                              | 4 + 1<br>tracer      | 42                     | 75                    | 6.58                      | 486                      |
| 7 Oct              | 1200        | A            | 4                              | ball                 | 35                     | 55                    | 8.94                      | 769                      |
| 1 Oct              | 0800        | B            | 4                              | 3 + 1<br>tracer      | 38                     | 59                    | 7.76                      | 513                      |
| 1 Oct              | 1000        | A            | 2                              | ball                 | 37                     | 57                    | 6.34                      | 487                      |
| 1 Oct              | 1330        | B            | 2                              | 4 + 1<br>tracer      | 41                     | 67                    | 6.10                      | 370                      |
| 1 Oct              | 1530        | A            | 6                              | ball                 | 36                     | 70                    | 6.42                      | 1000                     |
| 1 Oct <sup>a</sup> | 1600        | B            | 6                              | 4 + 1<br>tracer      | 40                     | 78                    | 7.04                      | 724                      |

<sup>a</sup>One of two machineguns was out of action during part of this run.

3. Tracers, when used with the M-60, resulted in more targets being hit in each pairing, e.g., 8.16/6.58 (33/42); 8.94/7.76 (35/38); 6.34/6.10 (37/41); 6.42/7.04 (36/40). In the underlined case, one machinegun failed during the trial, so the results are biased. These pairings show that tracer ammunition improves machinegun first hit (and total targets hit) performance during the daytime. This conforms to established doctrine.

4. Burst size for the M-60 bipod mounted machinegun in terms of first hit performance is shown to be superior for the two-round burst over the other alternatives, i.e., 4- or 6-round burst size. This selection is further reinforced by considering the total ammunition expended in each trial. The machinegunner and ammunition bearer have 273 rounds between them. We will use 300 rounds per gun rather than 273 as it simplifies our logistic problem without prejudice to the M-60 system by allowing it an extra pound of ammunition. Exploratory firing indicates that the 273 rounds per gun will not be exceeded using our selected two-round burst size. The two-round burst results in a significantly lower ammunition consumption. We are also not overheating the barrels and hence minimizing possible "cook-offs." This latter, however, is not really a consideration in our selection of burst size. Tentative decision for the M-60 is to use a two-round burst with a 1-to-1 tracer-to-ball ratio, subject to examining Stoner machinegun exploratory firing data.

5. Bandoleers versus Boxed ammunition Range C were discussed as alternate possibilities for the Stoner and M-60 machinegun.

Container Capacity  
(rounds metal link)

| <u>Ammo type</u> | <u>M-60 machinegun</u> | <u>Stoner machinegun</u> |
|------------------|------------------------|--------------------------|
| Bandoleer .....  | 100                    | 150                      |
| Boxed .....      | 150                    | 6-150                    |

It was decided that bandoleers are applicable to both machineguns, but that assistant gunner on the M-60 will help the gunner load the M-60, while the Stoner machinegunner has no loading assistance. The assistant gunner on the M-60 will not be permitted to link bandoleers. It is required that briefings include this prohibition. Both machineguns will be tried for both bandoleer and boxes and have photographs taken (to permit a subjective assessment of the problems).

6. Target acquisition alternatives when machineguns are used were discussed. Earlier, we had decided that assistant machinegunners and ammunition bearers would not assist the gunner in detecting the target because the assistant gunner and ammunition bearers had previously seen the ranges. It now appears that some of the machinegunners will also have seen the ranges once because of limitations on the available trained machinegunners. Thus, to minimize this possible bias, the gunner and assistant gunner will be applied to the target acquisition problem when

machinegun squads are fired. We will also permit machinegunners in the rifle squad mixes to be "talked on to the target," i.e., target acquisition assistance will be permitted.

7. Colt Rifle (M-16E1) exploratory firing results on Range C were presented as tabulated below.

COLT RIFLE (M-16E1) ON RANGE C

| <u>Date</u> | <u>Time</u> | <u>Burst<br/>Size<br/>(rd)</u> | <u>Tracer<br/>Ratio</u> | <u>Total<br/>Targets<br/>Hit</u> | <u>Total<br/>Hits</u> | <u>Cum. Exp.<br/>Time</u> | <u>Ammo<br/>Consumed</u> |
|-------------|-------------|--------------------------------|-------------------------|----------------------------------|-----------------------|---------------------------|--------------------------|
| 13 Oct      | 1130        | 3                              | 2 + 1<br>tracer         | 43                               | 121                   | 4.33                      | 1196                     |
| 13 Oct      | 1340        | 2 <sup>a</sup>                 | 1 + 1<br>tracer         | 44                               | 114                   | 5.40                      | 1389                     |
| 13 Oct      | 1535        | Semi                           | 1 + 1<br>tracer         | 44                               | 71                    | 5.03                      | NA                       |
| 13 Oct      | 1710        | 3                              | 2 + 1<br>tracer         | 42                               | 74                    | 5.67                      | 1659                     |
| 14 Oct      | 1320        | 3                              | ball                    | 48                               | 79                    | 4.01                      | 835                      |
| 14 Oct      | 1550        | 3 <sup>b</sup>                 | ball                    | 48                               | 76                    | 7.69                      | 1492                     |

<sup>a</sup>With bipod.

<sup>b</sup>Without bipod.

This data is not particularly conclusive. Two trials are interesting, i.e., the 1130 and 1710 trials with 2- and 3-round bursts. Unfortunately, they include the use of tracers, which we will not use with this weapon in any daytime firings, as per previous decision. Learning might be expected to favor the 1710 trial but is probably minimized because we suspect that the learning curve on our exploratory firers must be flattening out. Note that the two sighted trials (exposure time and ammunition consumption) support our previous decision (13 October meeting) to fire the Colt, Stoner, and M-14E2 in a two-round burst.

8. Forked Stick judgements were rendered and in the absence of factual information the subjective decision is that the forked stick will not be used with the M-14 or AK-47.

9. Colt and Stoner rifles will be fired with system weight on Range C, i.e., 300 and 210 rounds, respectively. If, as we acquire ammunition consumption data on this range, a lesser amount is adequate, we may reduce the ammunitions per firing point to reduce and simplify our logistic effort.

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