Technical Paper 365

LEVEL II

BEHAVIORAL FORECASTING FOR REALTRAIN COMBINED ARMS

Steven M. Medlin

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ENGAGEMENT SIMULATION TECHNICAL AREA

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The feasibility of board war gaming as a forecasting technique was investigated to determine behavioral benchmarks against which unit performance in engagement simulation (ES) exercises could be compared. Using the Fort Carson Forecasting Game, board exercises identical to REALTRAIN engagement simulation field exercises were conducted. Results indicated a few small differences between the two types of data; in general, however, the data from field and board exercises were comparable. This initial research effort to develop a feasible behavioral

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forecasting procedure for unit performance in engagement simulation exercises indicates that board war gaming has potential to meet these needs.

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Technical Paper 365

BEHAVIORAL FORECASTING FOR REALTRAIN COMBINED ARMS

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FOREWORD

The research presented in this paper is part of a broader program conducted by the Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI). One goal of this project is to provide quantitative methods for evaluating unit proficiency. The means for achieving this goal include basic research in criterion-referenced test methodology, models of measurement and scaling, and decisionmaking implications of test score interpretation.

Related, ongoing programs within the Technical Area include evaluation of small combat units under simulated battlefield conditions (REALTRAIN, ARTEP), qualification of tank crews and platoon gunnery (IDOC), and improvement of the reliability of ARTEP evaluation.

Anticipated future research under the Training and Education Project includes the development of a computer model for performance evaluation; and development of measurement, scaling, scoring, decisionmaking, and quality control models for use in performance evaluations when criterion-referenced testing procedures are employed.

The author wishes to thank 1LT James Fishback, MAJ Ron Nelson, LTC Eliot Parker, and the 4th Battalion of the 40th Armor from Fort Carson, Colo., for their contributions to the project. In addition, David Hannaman of Kinton Corporation provided valuable assistance in the data collection under Contract DAHC19-76-C-0024. The research program is responsive to the requirements of Army Project 2Q762722A764.

JOSEPH ZEIDNER
Technical Director

BEHAVIORAL FORECASTING FOR REALTRAIN COMBINED ARMS

BRIEF

Requirement:

To assess board war games for use in generating benchmark performance data against which unit performance in engagement simulation (ES) field exercises can be evaluated.

Procedure:

Using the Fort Carson Forecasting Game, board war game exercises identical in content to the field exercises in the Combined Arms Test conducted at Fort Carson, Colo., in March 1978 were carried out. The field and board exercises were compared to determine similarities and differences between the two types of exercises. Results were obtained in terms of maneuver routes, casualties suffered, and casualties inflicted by each type of weapon system.

Findings:

Although the maneuver routes of the field exercises were slightly more complex than the board game routes, the routes from the two types of exercises were similar. Casualties suffered were almost identical for field and board game exercises, and casualties inflicted by each type of weapons system were also quite similar. The only sizable differences were the percentages of casualties inflicted by tanks and by artillery. The similarities suggest that board war gaming is a feasible technique for developing benchmarks; the differences indicate that the board war game needs revisions to provide more accurate forecasts.

Utilization of Findings:

Results provide empirical evidence that board war gaming can yield process and product data comparable to data collected during engagement simulation field exercises. After the technique is validated, it can be used to develop performance benchmarks against which unit performance can be evaluated.

BEHAVIORAL FORECASTING FOR REALTRAIN COMBINED ARMS

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BEHAVIORAL FORECASTING FOR REALTRAIN COMBINED ARMS

INTRODUCTION

As part of its continuing effort to improve the training and evaluation of two-sided tactical field/maneuver exercises, the Army Research Institute for the Behavioral and Social Sciences (ARI) conducts research on tactical engagement simulation (ES). As part of the ES research program, a supporting system of evaluation is being developed, using engagement simulation exercises as the test bed. To evaluate performance in ES exercises, performance benchmarks must be defined that will make the evaluation system criterion-referenced.

One of the current modeling efforts, the Combat Operations Training Effectiveness Analysis Model (COTEAM), uses the concept of situation-specific forecasting to provide performance benchmarks. Situation specific means that forecasting must be geared to particular exercise conditions (e.g., force ratios, terrain, and weapons mix). It also means that resulting standards must be in the form of probability distributions, tolerance limits, or principle-derived sets of correct solutions to tactical problems. The dynamics of two-sided game playing do not permit exact, deterministic standards. The aim of the forecasting efforts is to generate, in one or more of the above formats, expectations about tactical processes and casualties for units participating in ES exercises. The methods being developed or adapted for generating these benchmarks include (a) military experts DELPHI, a small group process technique for developing and integrating forecasts or predictions of experts; (b) board war games; and (c) computerized ES models. If the forecasts obtained using these methods agree with those observed in ES exercises, these methods can be used to develop performance criteria against which unit performance in ES exercises can be compared.

The initial step in developing a method to simulate ES exercises is to assess similarities between data collected using the forecasting method and data collected during ES exercises. Significant differences can be determined statistically or by using the Turing test.[1] According to the Turing test, if military experts are given forecast outcomes and outcomes from actual ES exercises, and they cannot tell the simulated data from the real data, then the two data sources are considered to be identical.

Some preliminary steps have been taken in the validation process. The first questions to be considered are these: Can experts make these kinds of forecasts? Can forecasts be derived from a board game? And if the answers are yes to these two questions, how closely do the forecasts approximate observed ES data? As part of the REALTRAIN validation of

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[1] Turing, A. M. Computing Machinery and Intelligence, Mind, 59, 433-460, 1950.

rifle squads conducted at Fort Ord, Calif., in May 1977,[2] pilot work on forecasting was begun. Military experts were asked to forecast the outcomes of specific ES exercises. The data indicate that experts can make this type of forecast and that their forecasts are sensitive to such factors as the training/combat readiness level of the unit being evaluated.[3]

The second attempt at developing a method to produce accurate forecasts was conducted during the Armor/Antiarmor/Combined Arms Engagement Simulation Exercises, at Fort Carson, Colo., from January to April 1978. Using scenarios (e.g., force mix, operation order (OPORD), weather, terrain) identical to those used during the actual field exercises, data were collected using the Fort Carson Forecasting Game, a board war game. The game was developed specifically for the Fort Carson exercises. A 1:3,125 pictomap of the exercise lanes was used as the game board. A hexagonal grid overlay, with each hexagon corresponding to 50 m of terrain, was placed over the map to help standardize movement rates, detection distances, and range of weapon effectiveness. (See Appendix A for the game rules, which give movement rates, detection distances, etc.) In the two-player version of the game (there is also a six-player version), each player maneuvers his forces on a separate board, out of sight of the other player. Play is controlled by a single controller, who insures observance of the rules, keeps exercise time moving, delivers indirect fire, provides detections, and assesses casualties. Although the controller may seem to have considerable power, most of his functions are clearly and precisely explicated in the rules. The only subjective decision involves detections, and if the controller is unbiased and has had some experience with the actual exercise terrain, his decisions on detections can be fair, accurate, and easy to make.

The six-player version uses two platoon leaders, two game boards, and an isolated company/team commander on each side. The data presented in this report were collected using two-player games. The six-player game was conducted three times for developmental testing only, not for comparison with field exercises.

The purpose of the research effort was to explore the similarities and differences between field exercise and board game results. Only pilot data could be collected because of the limited time and resources available. No formal validation of board gaming as a forecasting technique was intended; rather, the study was directed at determining the feasibility of board gaming as a forecasting technique.

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[2]Banks, J. H., Hardy, G. D., Scott, T. D., Kress, G., & Word, L. E. REALTRAIN Validation for Rifle Squads: Mission Accomplishment. ARI Research Report 1192, October 1977.

[3]Mirabella, Angelo. Criterion-Referenced System Approach to Evaluation of Combat Units. Paper presented at the 19th Military Training Association, San Antonio, Tex., October 19, 1977.

METHOD

Subjects

Military officers (O1/O2/O3) from the 4th Battalion of the 40th Armor played the Fort Carson Forecasting Game as part of their training. Two captains played exercises 1a, 2a, and 5a (Table 1) before serving as company/team commanders during the combined arms test (CATEST) phase of the Fort Carson REALTRAIN field exercises. After the field exercises were finished, three lieutenants from the same unit played the game. Exercises 1, 2, and 3 were played by two of the officers, at which time one of them was replaced, and the replacement played against one of the experienced game participants (exercises 4, 5, and 6). (Note that exercises 1 and 1a, 2 and 2a, 5 and 5a are the same exercises played by different players. Appendix B describes the exercises and OPORDS, Appendix C the force mixes, and Appendix D the order of exercises.)

Table 1

Exercise Design

Exercise no.	Players	Mission/force mix
1 1a	A and B D and E	Attack from N, defend in S/ equal forces
2 2a	A and B D and E	Attack from S, defend in N/ equal forces
3	A and B	Attack from N, defend in S/ equal forces
4	A and C	Attack from S, defend in N/ equal forces
5 5a	A and C D and E	Meeting engagement/ equal forces
6	A and C	Attack from N, defend in S/ attack team has two tank platoons, defender has none

Design

The forecasting experiment was designed to be as similar as possible to the actual field exercises. As often as possible, the same players were used, and they were given OPORDS (Appendix B), force mixes (Appendix C), and weather conditions identical to those used in the field, with minor exceptions as noted in the appendixes. The weapon ranges and kill characteristics used were those developed for the REALTRAIN system.[4] The exercises were played in the same order that they were conducted in the field (Appendix D). The game board was a 1:3,125 map of the terrain used for the field exercises.

Procedure

The game rules were given to the participants the day before the first exercise so the players could learn the rules. The rules were briefly explained and questions were answered before the start of the first game. OPORDS were issued and the players were allowed approximately 45 minutes to develop their tactics and to take their defensive positions or assemble at their assembly areas (AA). Each player used a separate game board, out of sight of the opposing force. The controller indicated when it was time for the game to begin and announced "game time" at appropriate intervals. For example, for the first move of the game, the controller might announce, "It is time 000. Take 5 minutes worth of moves, as allowed by the rules." The players would move their forces; detections (if any) would be determined by the controller, clues (if any) would be given by the controller, and direct and indirect fire (if any) would be played according to the rules (Appendix A) and as enforced by the controller. Play continued in this manner until one side or the other reached its objective, or until the game was ended because one (or both) teams suffered excessive casualties. Since the game served a training function as well as a data collection/research function, the controller usually allowed the games to continue until one of the teams was reduced to only one or two operational vehicles. An abbreviated after action review (AAR) was conducted, in which each player viewed the other player's game board; they discussed tactics, errors in planning, and general impressions of the exercise.

During the exercise, the players traced the movements of their forces on acetate placed over the game board and hex overlays. The controller kept a net control sheet (NCS) that recorded kills--target identification and type of weapon system (e.g., tank, heavy antitank, TOW, individual soldier), firer identification and type of weapon system, time of the engagement, and effects of the engagement.

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[4] U.S. Army Armor School, U.S. Army Infantry School, and ARI. REALTRAIN: Tactical Training for Combined Arms Elements. Training Circular 71-5, January 1975.

RESULTS

The results presented are of two basic types: the maneuver routes of the two opposing forces and casualty data.[5] The statistics presented are purely descriptive for several reasons. First, the data are of such a nature that inferential statistics cannot be used. Although maneuver routes can be quantified and deviations between observed and forecast routes can be computed, the differences would be artifactual. In each of the exercises, both in the field and for the board game, several maneuver routes were available, any of which would be reasonable. Thus, a comparison of maneuver routes would add no information. Furthermore, for both the maneuver routes and the casualty data, the sample size was too small (n = 2 at best) to permit statistical comparison.

The second reason for not using inferential statistics is more fundamental: The results of the statistics may be misleading. Although significant differences may be found, the forecasted and observed exercises may not be different to military experts. If these experts cannot tell the difference between forecasted and observed exercise data, does it matter if the data are statistically different?

A third reason for not using inferential statistics is that the cutoff point for the end of the exercise was determined differently for the field exercises and the forecasting game. The field exercises were limited by time constraints, weather, and equipment problems. The forecasting procedures did not have any of these problems, and since the game served a training function as well as an experimental/data collection function, the controller typically let the exercise continue until one team had only one or two operational vehicles remaining.

Maneuver Routes

Maps of the Fort Carson terrain with the maneuver routes for both teams indicated are presented in Figures 1 through 12. Pairs of maps are presented for six of the exercises. The blue team (solid lines) is the attacking force, which always starts at the assembly area (AA). The red team (dashed lines) is the defensive force (except in Figures 9 and 10, in which both forces are attacking), and the dots indicate the initial defensive positions. Arrows indicate the direction of movement, and a slash across the route signifies the final position of the unit moving along that route. The final position may be the place where the unit was destroyed, the place where the unit stopped until the end of the exercise, or the place where the unit was when the exercise was terminated. Note,

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[5] Because of the limited personnel available to serve as data collectors, the only process measures that could be collected were the maneuver routes. Other process measures--detections, halts, overwatches, searches--can be collected in the game if a data collector is assigned to each player and trained to perform the data collector's duties.

however, that casualties are not specifically indicated on the maneuver routes; these maps are intended to show maneuver routes, not where casualties occurred.

Since the Fort Carson forecasting technique uses the concept of situation-specific forecasting, field and forecast maneuver routes must be compared for each exercise individually, rather than across all exercises. Comparing Figures 1 and 2, the REALTRAIN map has considerably more loops and "split points," or places where the forces separated onto different paths. (Note the loops in the lower right area of the maneuver routes and in the middle left near the 08 map marking.) The attack routes are almost identical--both attackers used the creekbed as an approach route. The defensive positions are quite similar also; the forecast exercise team used a slightly more spread-out defense than the field exercise team, but both defenses are set up on the same area.

In forecast and REALTRAIN exercise 2 (Figures 3 and 4), the defensive postures taken are comparable. Both defenders chose the same terrain to defend, and used essentially the same defensive tactics, i.e., having dismounted infantry at the forward edge of the defense, tanks as the main defensive positions, and TOWs and tanks in overwatch. The attack routes are also similar; both are two-pronged attacks up creekbeds, with the main thrust directed at the hills near the 08 map marker.

A comparison of the two types of exercise 3 (see Figures 5 and 6) yielded major differences between the field and forecast data, because the field maneuver routes were more complex. In forecast exercise 3 (Figure 5), the attacking team sent all of its units down the western flank of the attack lane. Even though he was taking considerable fire and was losing many of his forces, the team leader did not develop a new attack plan, nor did he adjust his original plan to the emerging engagement situation. Consequently, his forces were destroyed by the defending team, which suffered minimal casualties. In contrast, Figure 6 shows a complex field exercise, with many split points, some looping or wandering about, and considerable defensive adjustment to counter the thrust of the attack. (Note personnel carriers (PCs) 23 and 89, and TOWs 43 and 51.)

Although the attack routes for exercise 4 are the same in the field and forecast exercises (Figures 7 and 8), the field maneuver routes look considerably more complex. In forecast exercise 4, one of the players was a novice to the game and REALTRAIN exercises. As the attacking team commander, he made several mistakes--poor use of infantry, poor use of artillery, and poor adaptability. He did not use his infantry to clear the area ahead of his tanks; as a result, his tanks were ambushed by infantry and tanks. His artillery was not used to fire at specific sighted targets, but was called in areas where enemy units may have been, even though no detections were made in the area. Finally, and most important, he did not adapt his attack plan to the exigencies of the situation. He lost vehicles in a certain area and then sent more vehicles into the same area, where they, too, were destroyed. The field exercise commanders did

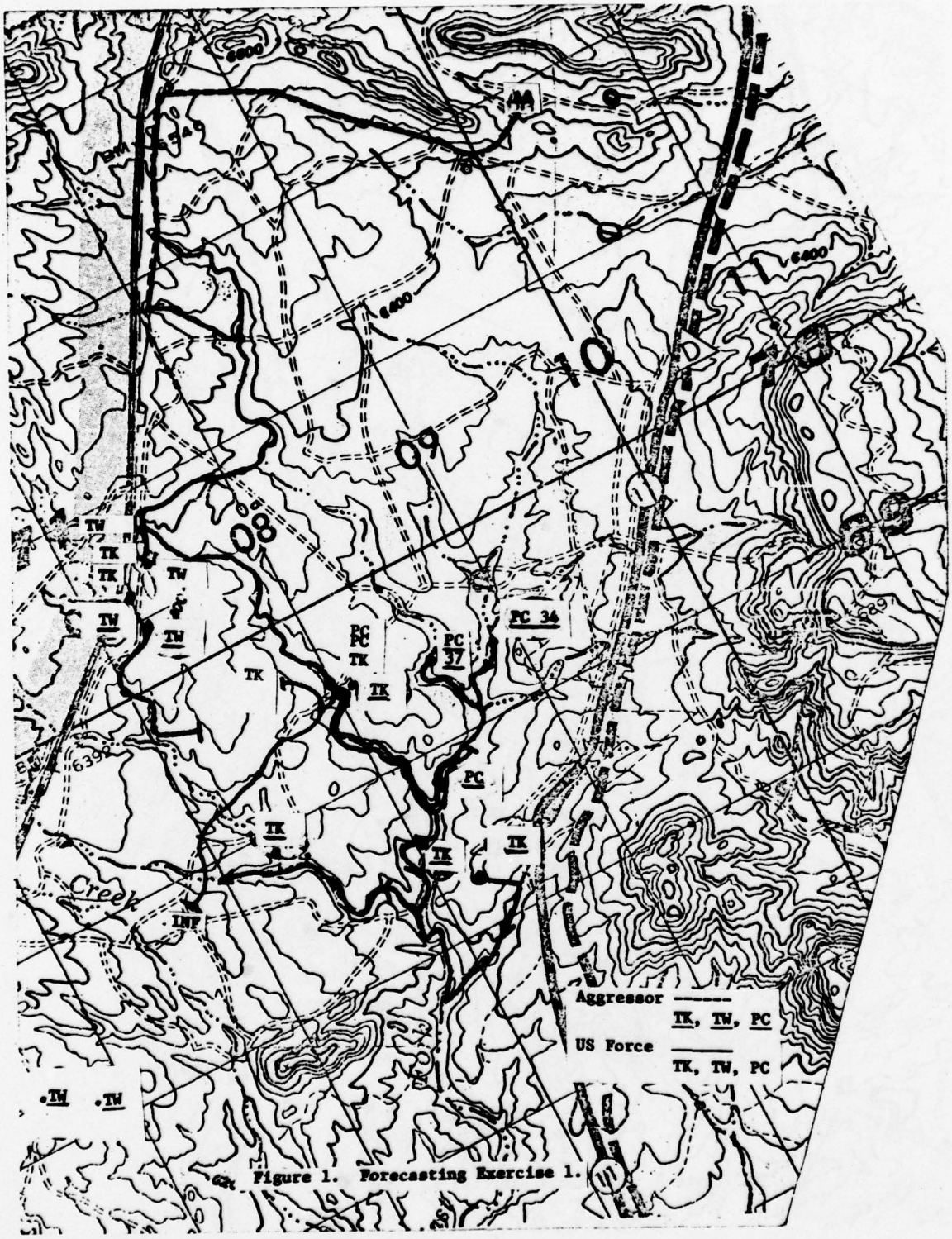


Figure 1. Forecasting Exercise 1.

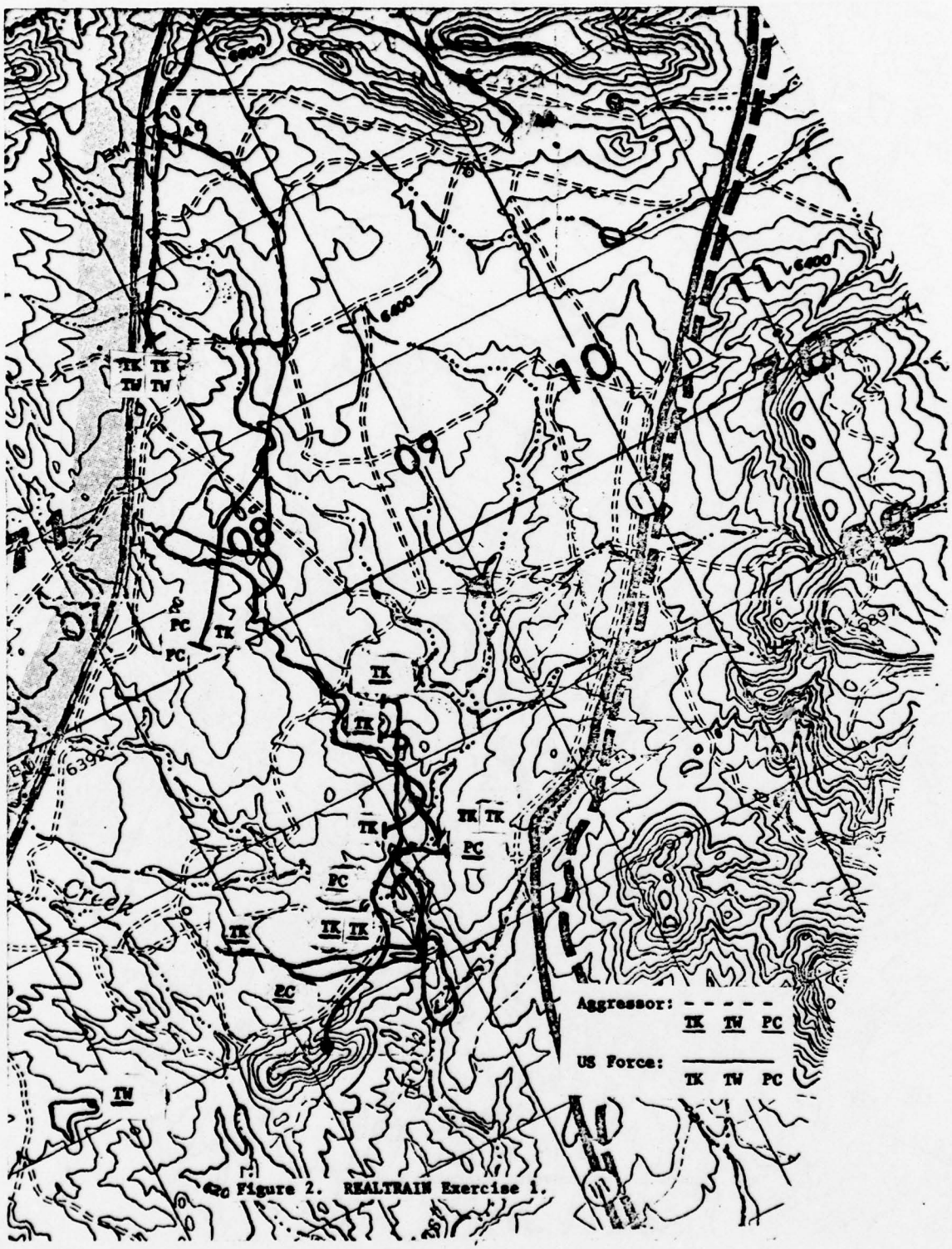


Figure 2. REALTRAIN Exercise 1.

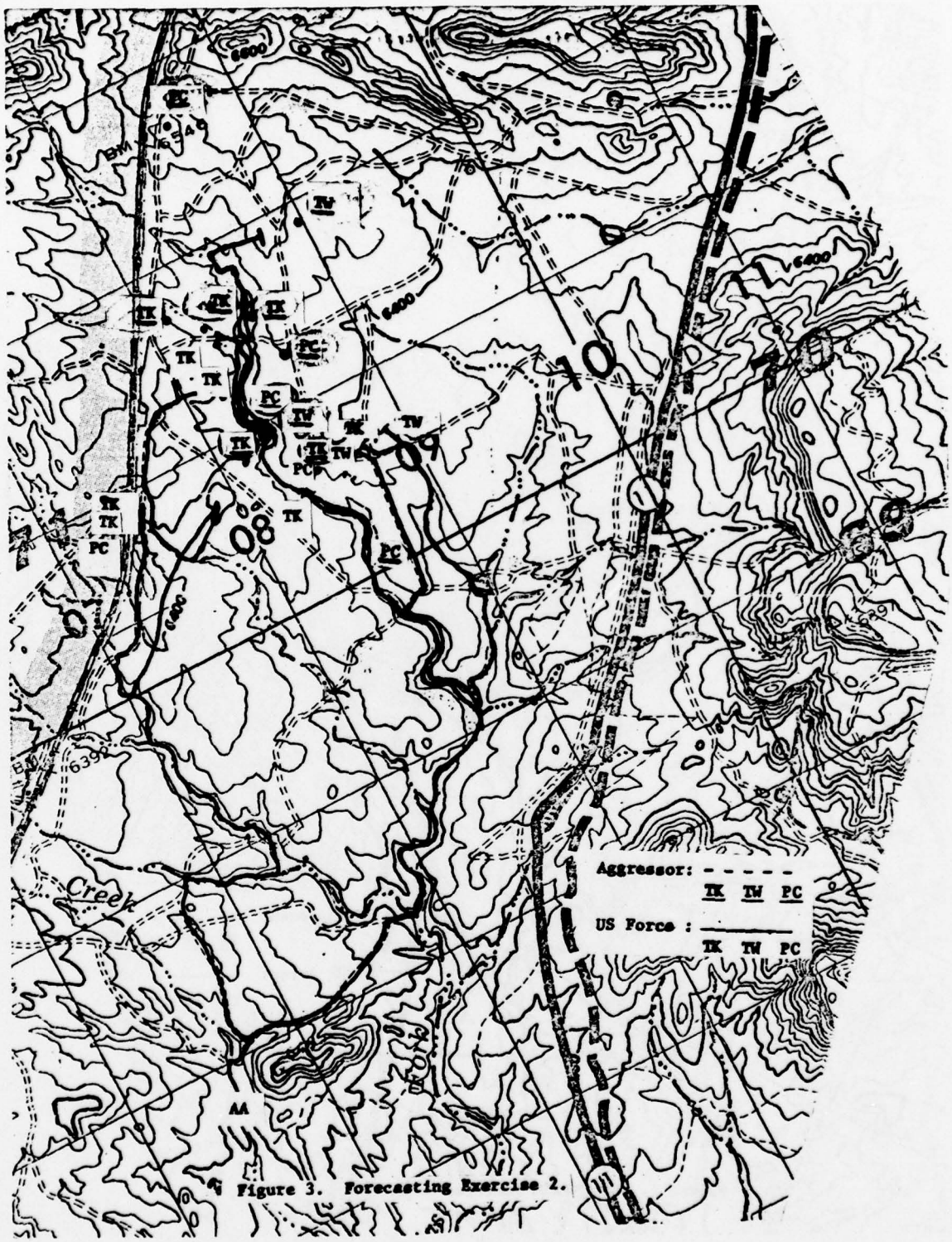


Figure 3. Forecasting Exercise 2.

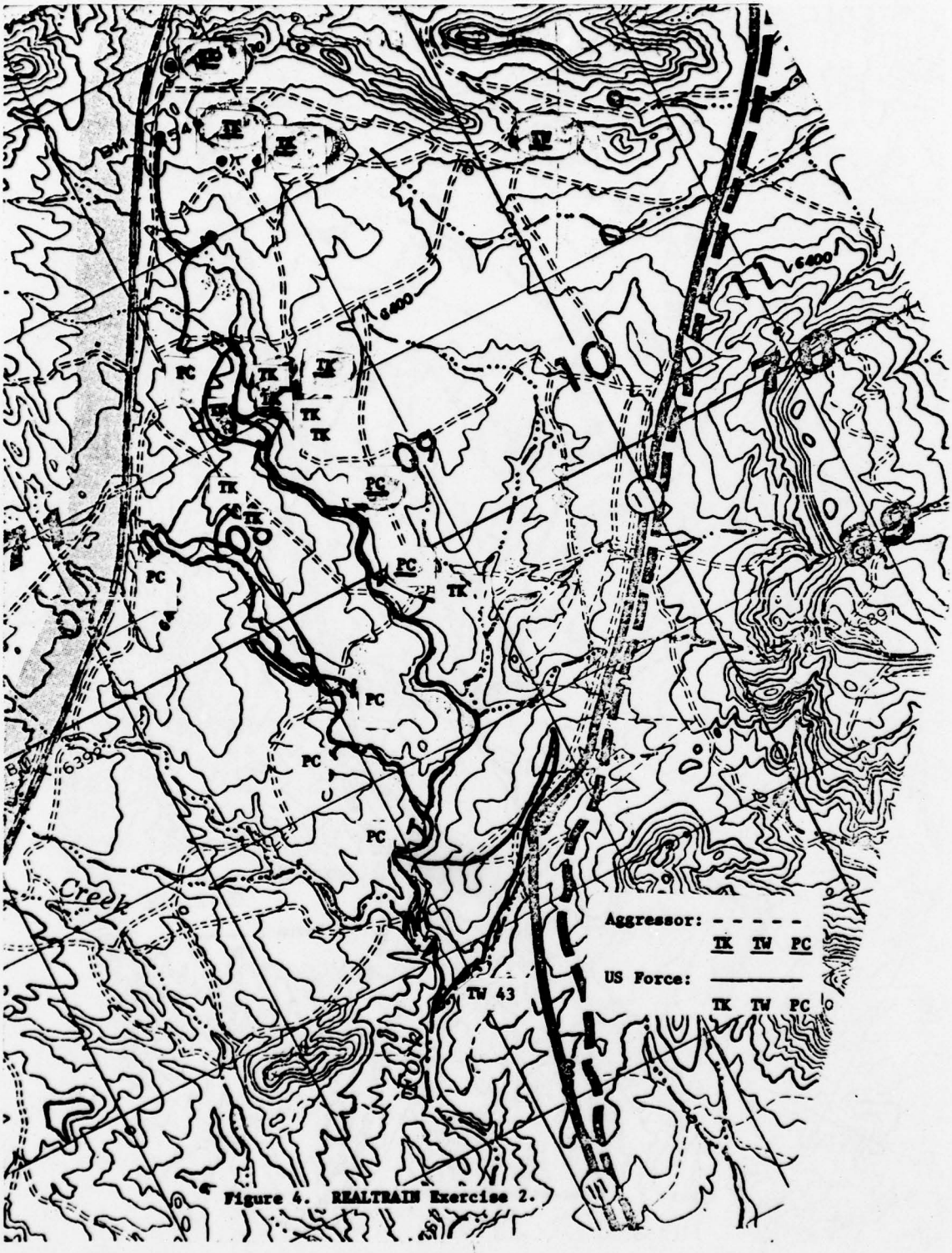


Figure 4. REALTRAIN Exercise 2.

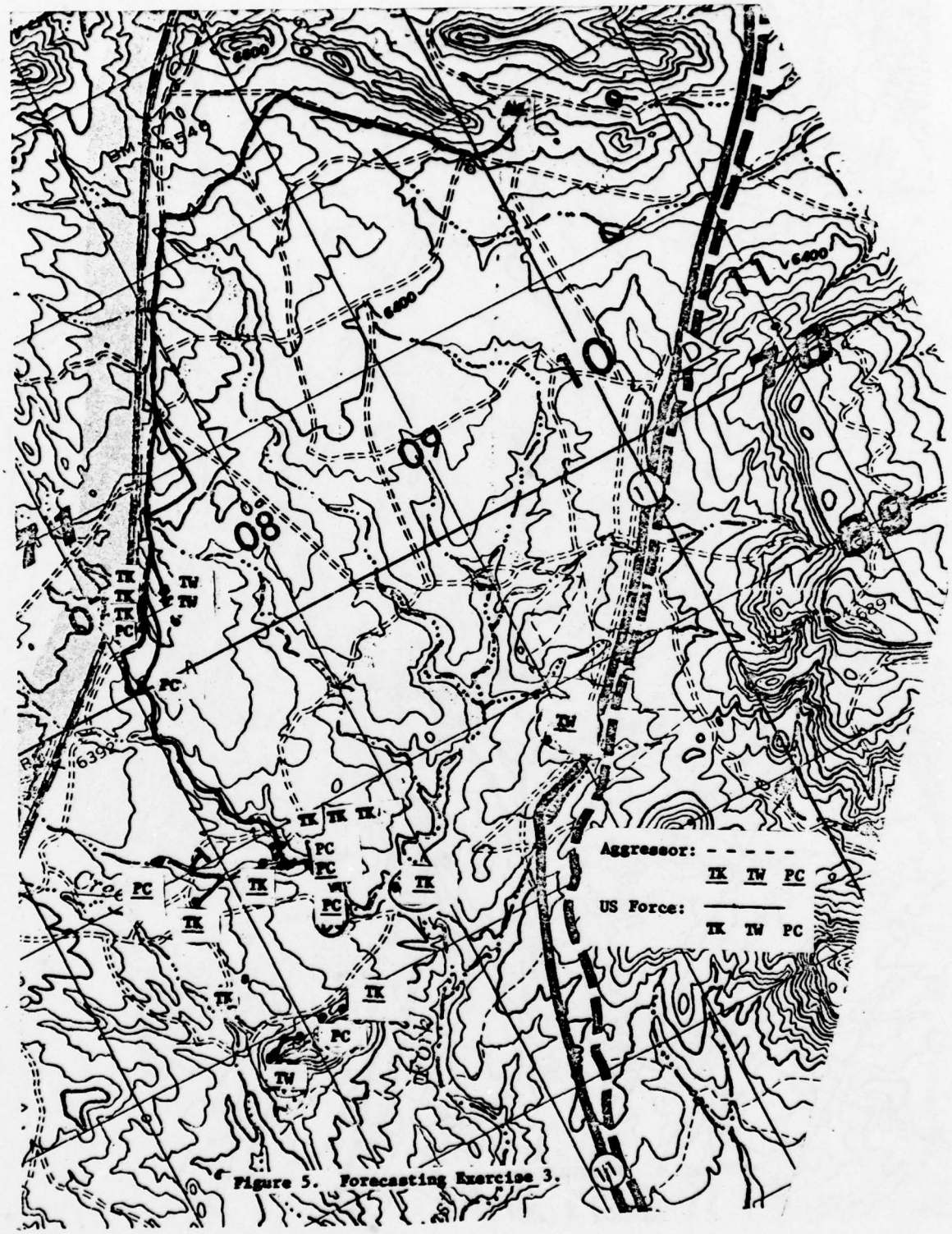


Figure 5. Forecasting Exercise 3.

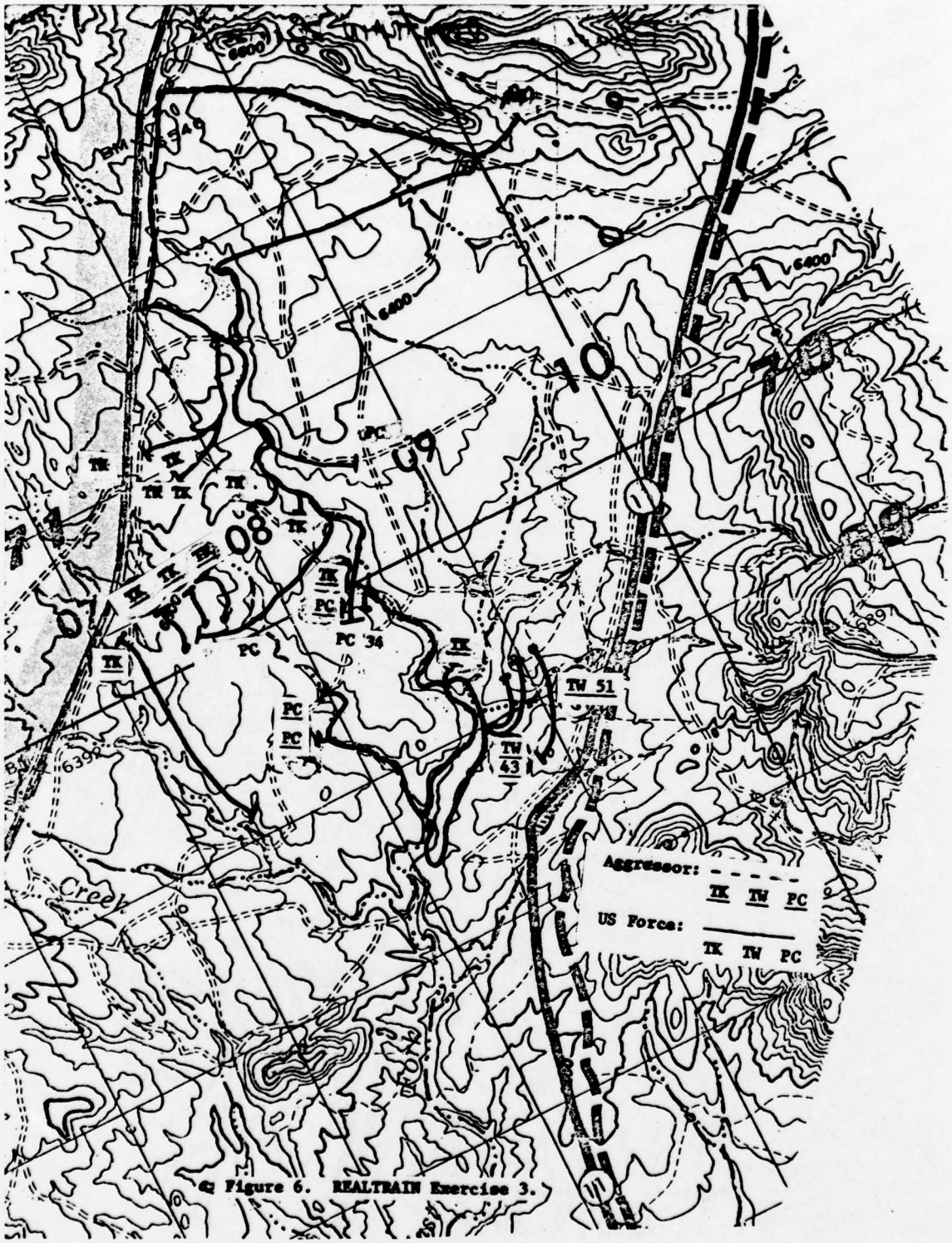


Figure 6. REALTRAIN Exercise 3.

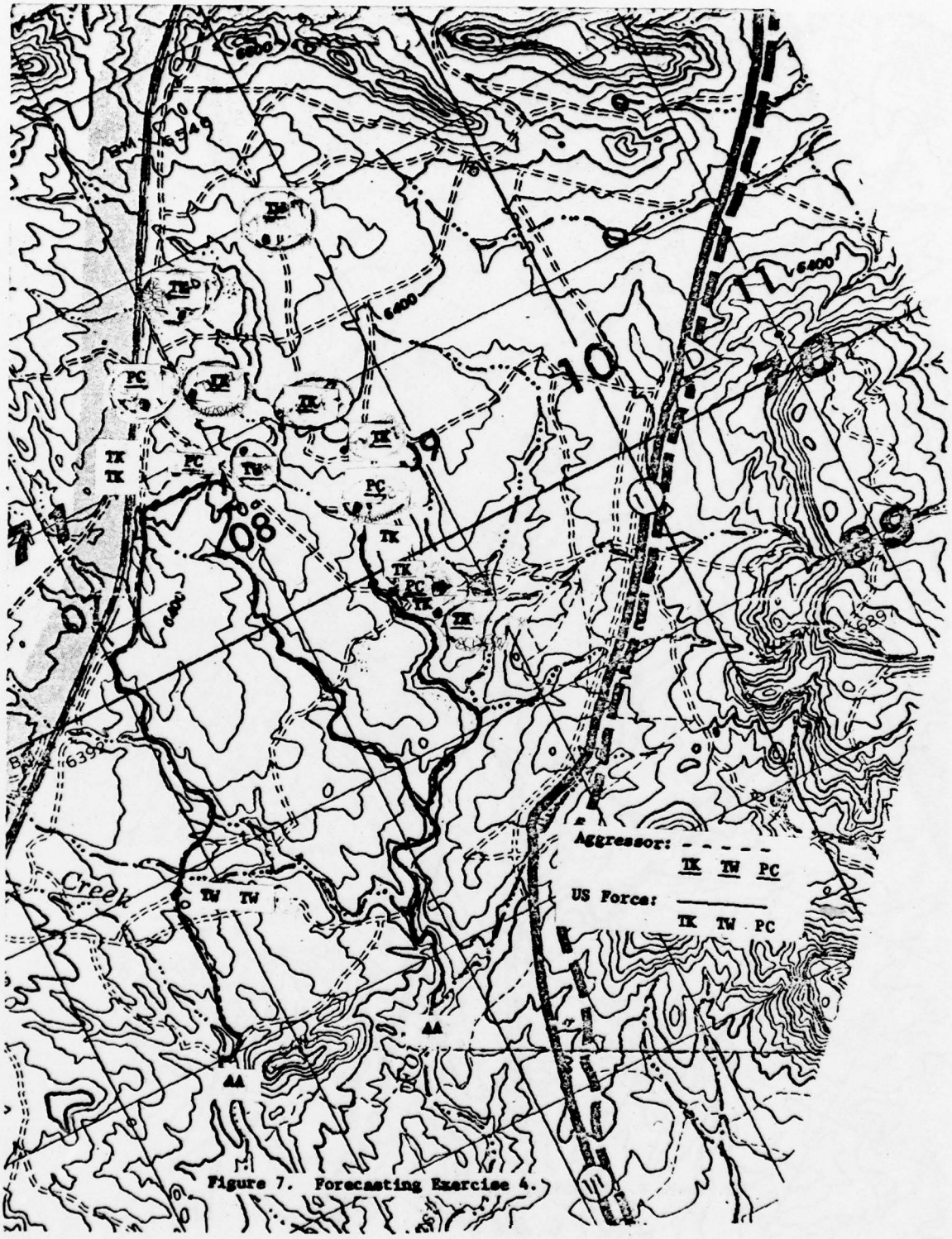


Figure 7. Forecasting Exercise 4.

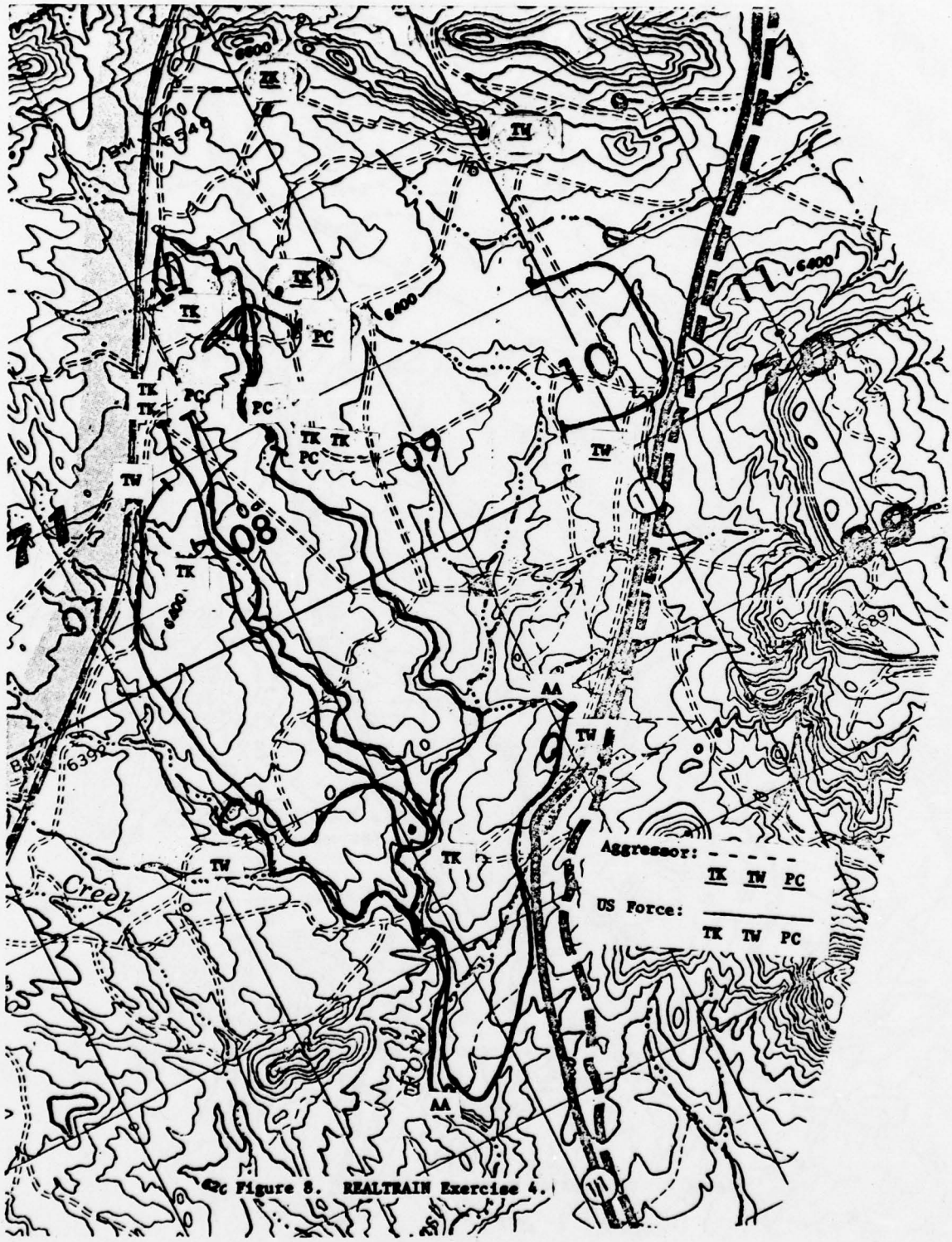


Figure 8. REALTRAIN Exercise 4.

not make these mistakes; thus, the field exercise (Figure 8) is tactically more complex.

REALTRAIN exercise 5 (Figure 10) maneuver routes are considerably more complex than in forecast exercise 5 (Figure 9). In the field exercise, several units--infantry, TOW 36, TOW 43--wandered about, while others--infantry, PC 24, PC 50, PC 23--missed the engagement almost entirely. Only TOW 15 was used in overwatch. In the forecast exercise, no one was lost or missed the action; hence, the map looks somewhat simpler. Note also the use of all four TOWs in overwatch, a much better use of the TOW's capabilities than in the field exercise. And finally, the attack from the north included an approach on the eastern flank, near Highway 11. This exercise was the only one in which a player or field commander realized that that attack route was a viable alternative. If the field commanders had had considerably more experience with the board game before the field exercises, they might have seen this possibility and used that attack route. Thus, the game can serve a useful training function as well as a data collection function.

The data from field and forecast exercise 6 (Figures 11 and 12) are almost identical. The attack routes are the same, although the field exercise shows a few more split points and routes of maneuver. The defensive placement of the TOWs and infantry are also comparable, because the forecast positions are only a few hundred meters at most from the field exercise positions.

Several of the maps also show the way in which the game players and field exercise commanders adjusted their defensive postures to counter the main thrust of the attack. Figures 1 through 4 show these defensive adjustments clearly. For example, in Figure 1, PCs 37 and 34 moved back from their original positions and headed west to engage the infantry, who broke through the defensive line. Similarly, in Figure 4, TOW 43 withdrew to the main defensive line to help counter the attack.

Casualties Incurred

Table 2 summarizes the number and type of casualties inflicted by each weapon system during the CATEST field exercises, and Table 3 presents the data as percentages. Tables E-1 through E-8, in Appendix E, show the information in detail for each field exercise. Casualties as a function of time are listed across the top of each table; the first event is the first casualty, the second event is the second casualty, etc. The events, or casualties, are numbered; the target team and type are indicated; and the type of weapon system inflicting the casualty is shown. Tables E-9 through E-17 present the same information for the forecasting exercises, which is summarized in Tables 4 and 5.

Because of the small sample size and the different cutoff rules for the end of the exercises, it is not reasonable or informative to compare a specific forecasting exercise to the corresponding field exercise. By

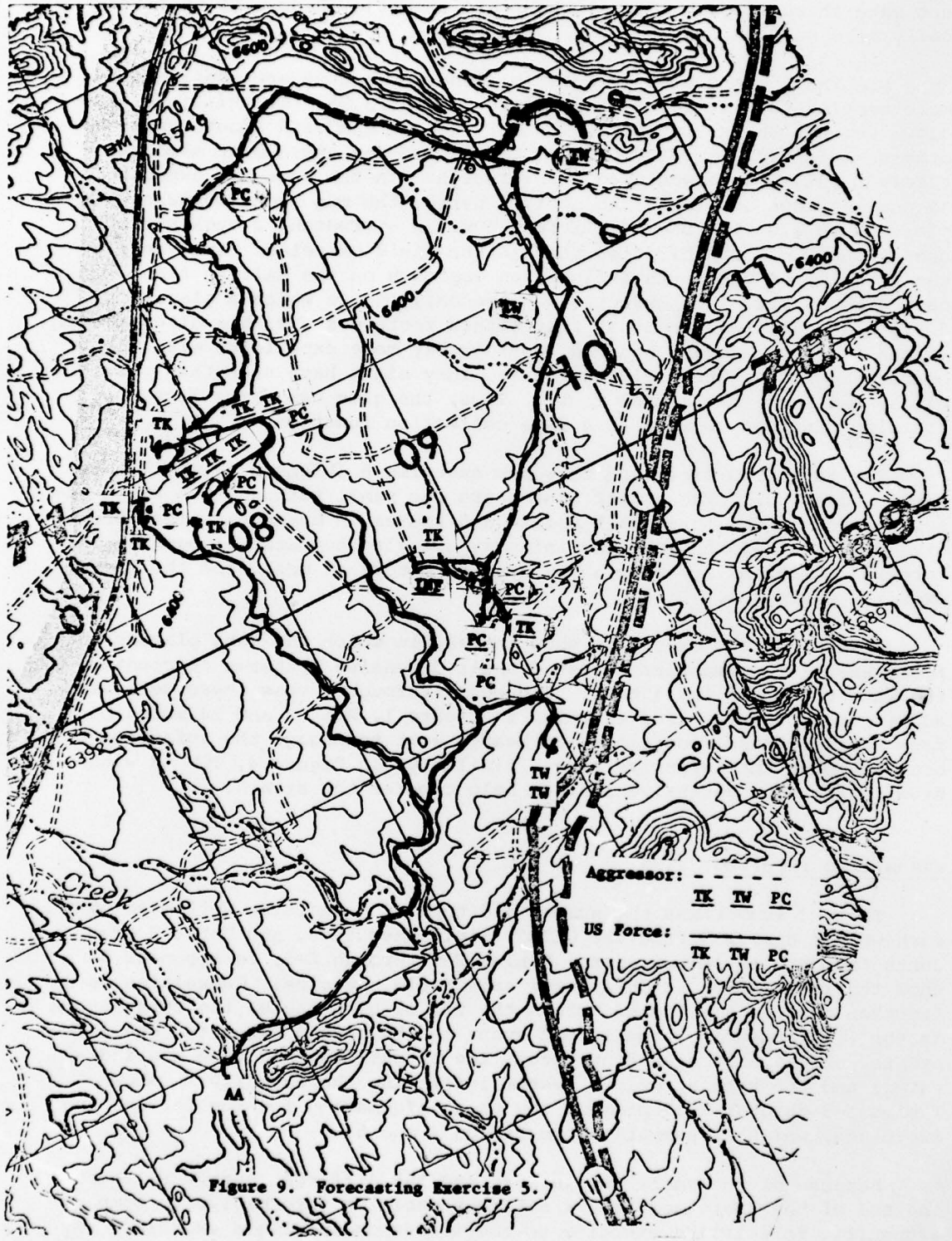


Figure 9. Forecasting Exercise 5.

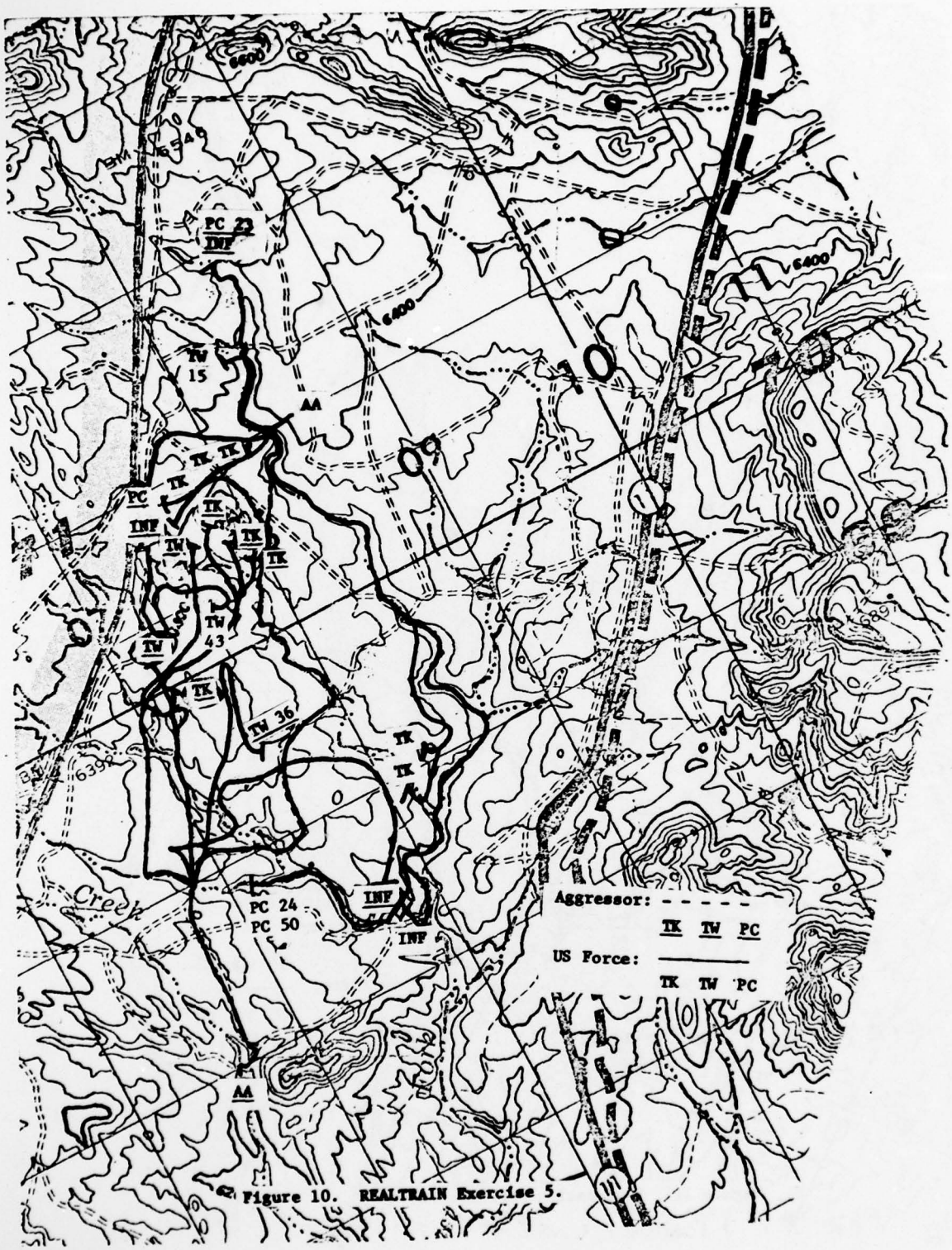


Figure 10. REALTRAIN Exercise 5.

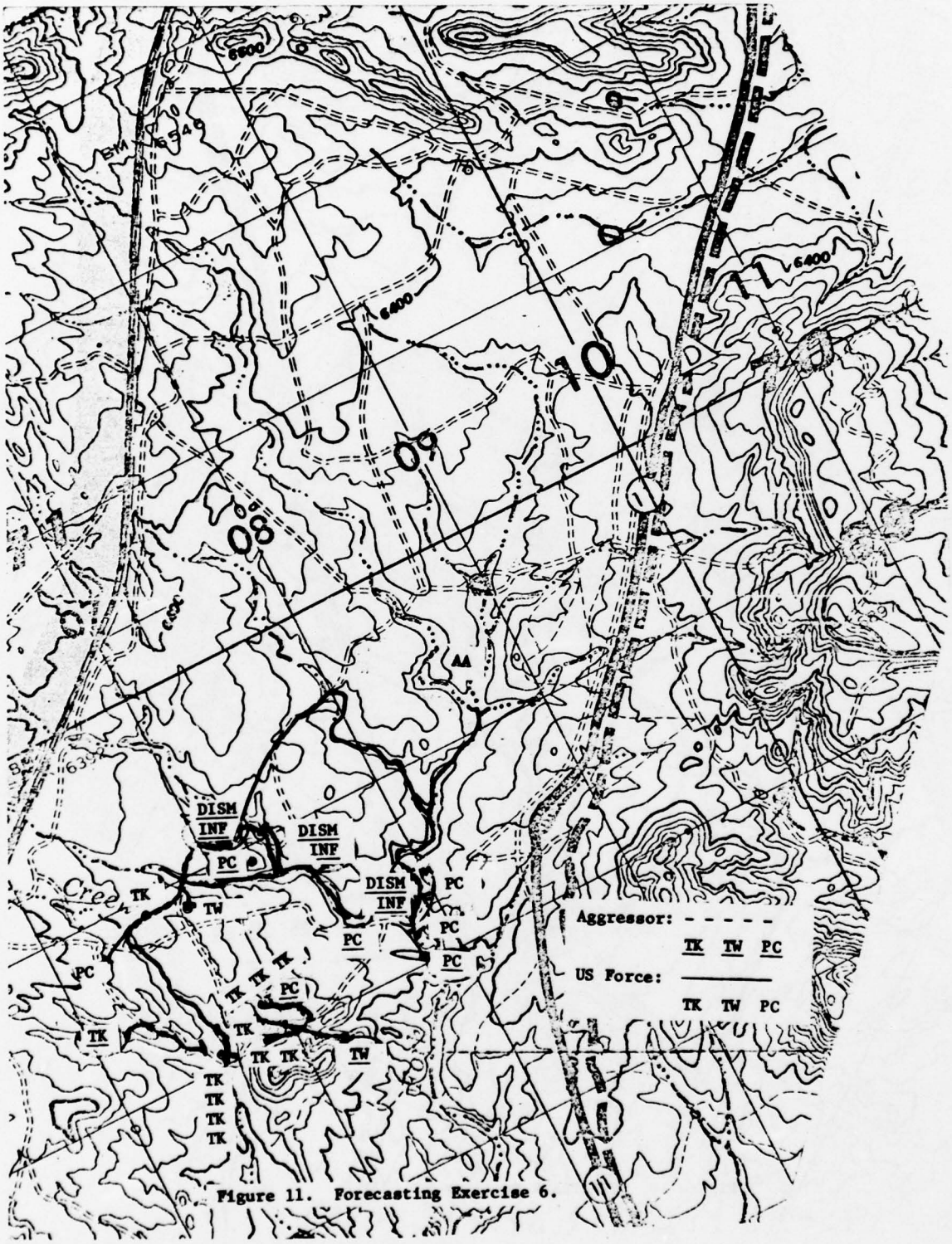


Figure 11. Forecasting Exercise 6.

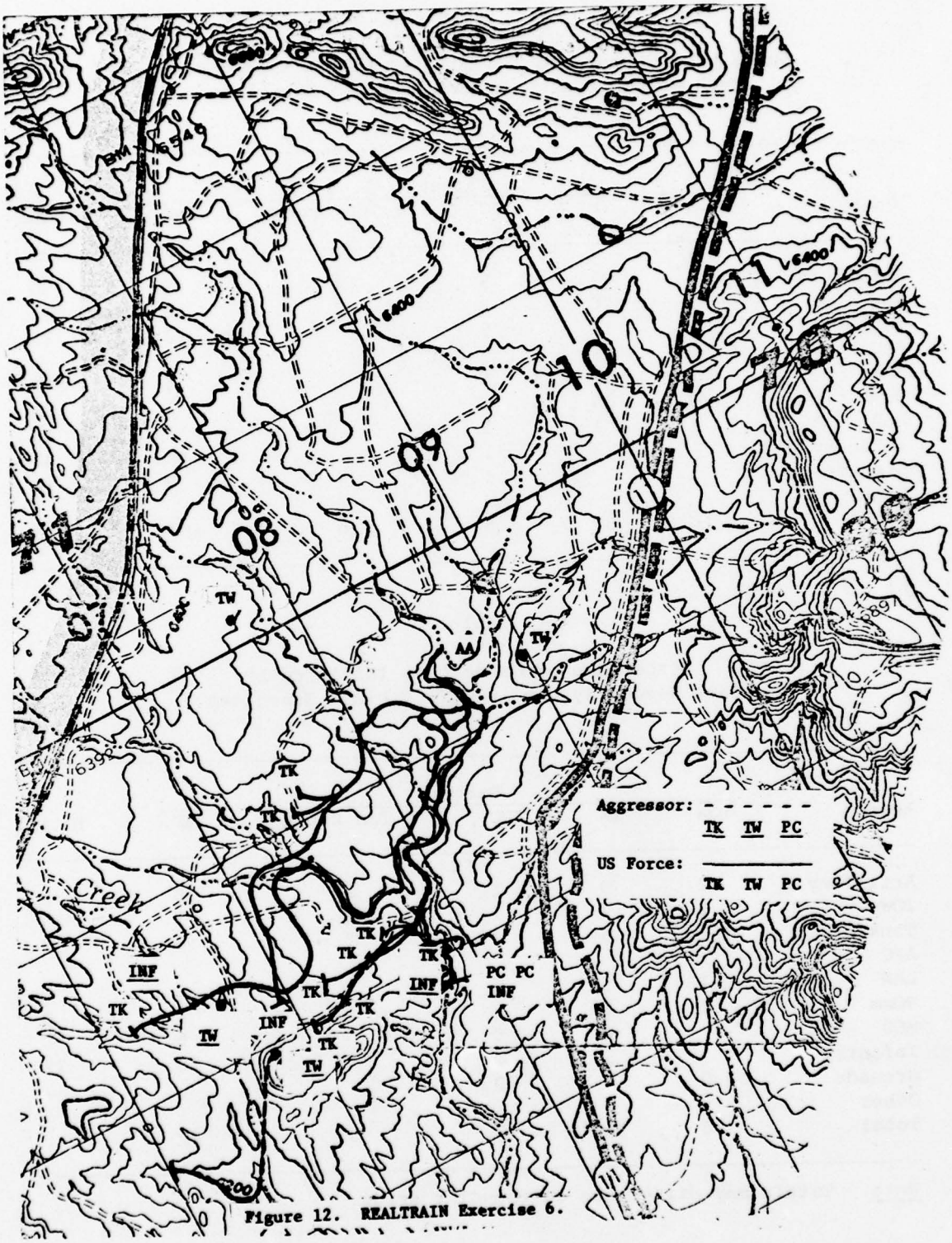


Figure 12. REALTRAIN Exercise 6.

Table 2

Summary of Number and Type of Casualties Inflicted by Each Weapon System in CATEST Field Exercises

Weapon	Target					Total
	TOW	TK	APC	¼ Ton truck	INF.	
Artillery	4	21	3	4	18	50
TOW	5	20	3	2	2	32
Tanks	2	11	5		13	31
APC						
LAW	2	11	1		4	18
90mm	4	14			2	20
M60		1	1		11	13
Infantry		2	1		45	48
Grenade	1		1		9	11
Other						
Total	18	80	15	6	104	223

Table 3

Percentage of Casualties Inflicted by Each Weapon System in CATEST Field Exercises

Weapon	Target					Total
	TOW	TK	APC	¼ Ton truck	INF.	
Artillery	2	9	1	2	8	22
TOW	2	9	1	1	1	14
Tanks	1	5	2		6	13
APC						
LAW	1	5	0		2	8
90mm	2	6			1	9
M60		0	0		5	6
Infantry		1	0		20	22
Grenade	0		0		4	5
Other						
Total	8	36	7	3	47	

Note. Totals may differ due to rounding error.

Table 4

Summary of Number and Type of Casualties Inflicted by Each Weapon System in All Forecast Exercises

Weapon	Target					Total
	TOW	TK	APC	¼ Ton truck	INF.	
Artillery	7	18	6		5	36
TOW	6	20	6			32
Tanks	5	22	9		45	81
APC			1		2	3
LAW		8	6			14
90mm		14	5			19
M60						
Infantry					76	76
Grenade						
Other						
Total	18	82	33		128	261

Table 5

Percentage of Casualties Inflicted by Each Weapon System in All Forecast Exercises

Weapon	Target					Total
	TOW	TK	APC	¼ Ton truck	INF.	
Artillery	3	7	2		2	14
TOW	2	8	2			12
Tanks	2	8	3		17	31
APC			0		1	1
LAW		3	2			5
90mm		5	2			7
M60						
Infantry					29	29
Grenade						
Other						
Total	7	31	13		49	

Note. Totals may differ due to rounding error.

collapsing across all field exercises and across all forecasting exercises, however, reasonable comparisons can be made. As Tables 3 and 5 indicate, the percentages for the types of casualties incurred are extremely close. For the field exercises, the percentages of TOWs, tanks, PCs, ¼-ton trucks (jeeps), and infantry are 8, 36, 7, 3, and 47, respectively (Table 3, last row). The same percentages for the forecast exercises are 7, 31, 13, 0, and 49 (Table 5, last row). (Note that ¼-ton trucks were not played in the forecasting game.) These results are remarkably close and attest to the similarity of the outcomes.

Examination of the individual cells in Tables 3 and 5 reveals that even the percentages for specific types of casualties (e.g., tank, TOW, infantry) as inflicted by specific weapon systems (tank, TOW, 90mm, etc.) are similar. The major differences are in the percentages of infantry killed by tanks and infantry killed by infantry. For the field exercises, these percentages are 6% and 20%, respectively, whereas for the forecasting exercises these percentages are 17% and 29%. When casualties inflicted by grenades and machineguns are included in the field exercise data, the percentage increases from 20% to 29%, equal to that from the forecast data. (In the forecasting game no distinction was made between the types of weapon the infantry used to neutralize other infantry.)

Casualties Inflicted

The total percentages of casualties inflicted by each weapon system are presented in the last column of Tables 3 and 5. These are the percentages of actual kills recorded by each weapon system. The two major discrepancies occur in the casualties inflicted by artillery and tanks. Artillery accounts for 22% of casualties in field exercises and 14% in forecasting exercises, whereas tanks account for 13% of casualties in the field and 31% in the game. Infantry, if machine guns and grenades are included, accounts for 33% and 29% of the casualties in the field and game, respectively.

The difference in artillery casualties is difficult to interpret. In the field exercises, artillery simulators were sometimes slow and inaccurate. During the forecasting procedure, however, artillery was delivered quickly and accurately. It would seem reasonable that artillery casualties would be greater in the forecasting exercises than in the field, but the data indicate just the opposite. One reason for this result may be that the firemarkers who deliver the artillery and help to assess casualties head toward personnel to deliver the artillery, rather than dropping it where it should be delivered. In future field exercises, better and more accurate fire control procedures may help to clarify this discrepancy. Other explanations involve the game and its participants. First, the players (O1/O2) may not have known how to use artillery as well as the company/team commanders (O3) in the field. Second, the kill radius for artillery may have been less in the game than in the field. Third, the players may not have been able to locate the opposition as precisely in the game as they could in the field. Finally, the

absence of a fire support team (FIST) may have been responsible for fewer artillery casualties in the games. In the field exercises, the FIST's only function was to call artillery fire. The players may have been overloaded with responsibilities and either forgot to use artillery or misused it because of the time and attention their other duties required.

The large difference in percentages of tank casualties, 13% for field exercises to 31% for forecasting exercises, is not as difficult to interpret. The discrepancy is due mainly to the large percentage of infantry casualties inflicted by tanks in the forecasting exercises (17%) and the relatively small percentage in the field exercise (6%). This result is an artifact of the different training functions served by the two sets of exercises. The REALTRAIN exercises primarily teach maneuvering, command, and control. Tanks are not provided with antipersonnel shells. In the forecasting exercises, however, training includes all facets of a platoon leader's and tank commander's duties. Thus, in the game, the players were allowed to use antipersonnel shells, such as the Beehive; consequently, many more infantry casualties were recorded in forecasting exercises than in field exercises.

The percentages of casualties, as recorded on the net control sheet (NCS), for both field and forecasting exercises are presented in Tables 6 and 7. Note that these percentages are slightly different from the total percentages in Tables 3 and 5. This difference occurs because Tables 6 and 7 include casualties that are not kills, such as a hit that causes loss of communications or immobilizes a vehicle. Again, in view of the limited number of exercises, direct comparisons of individual exercises would be misleading. By collapsing across field exercises and across forecasting exercises, reasonable comparisons can be made. As Tables 6 and 7 show, the overall percentages of casualties inflicted by weapon type for the forecasting exercises are similar to those observed in the CATEST and in the REALTRAIN data from Europe.

The only sizable differences are those for casualties inflicted by tanks and artillery. In the game, 27.7% of casualties were inflicted by tanks, and only 13.9% and 21.7% were inflicted by tanks in the CATEST and REALTRAIN exercises, respectively. The reason for this difference was given previously: The game permitted use of antipersonnel shells, and thus more infantry casualties and more overall casualties resulted. Artillery accounted for 13.9% of casualties in the forecasting exercises and 27.4% and 24.2% of casualties in the CATEST and REALTRAIN, respectively. The explanation for these differences is the same as that presented above for total percentage of actual kills caused by indirect fire.

Considered together, the casualty data from the forecasting game are remarkably similar to those observed in the CATEST and REALTRAIN field exercises. The discrepancies are small, not very numerous, and can be reasonably well explained. Thus, the initial phase of the Forecasting Game validation procedure seems to be successful.

Table 6

Percentages of NCS Casualties Inflicted by Weapon Type in Field Exercises

Weapon type	Exercise C-1	C-2	C-3	C-4	C-5	C-6	C-7	C-8	CATEST total	Europe REALTRAIN
TOW	6.7	11.1	20.0	8.7	16.1	29.6	10.5	9.4	14.3	7.6
Tank	20.0	3.7	16.7	4.3	35.5	0	13.2	15.6	13.9	21.7
Artillery	33.3	22.2	3.3	47.8	3.2	18.5	26.3	34.4	22.4	24.2
APC	0	0	0	0	0	0	0	0	0	6.0
Infantry	6.7	33.3	36.7	30.4	29.0	22.2	28.9	21.9	27.4	27.6
LAW	13.3	0	6.7	0	9.7	14.8	5.3	6.3	6.7	4.5
90mm	20.0	22.2	13.3	8.7	6.5	7.4	5.3	6.3	10.3	10.7
Grenade	0	7.4	3.3	0	0	7.4	10.5	6.3	4.9	3.3

Table 7

Percentages of NCS Casualties Inflicted by Weapon Type in Forecast Exercises

Weapon type	Exercise 1	1a	2	2a	3	4	5	5a	6	Overall
TOW	3.8	14.3	2.3	9.7	41.2	11.1	33.3	13.8	28.6	13.4
Tank	59.6	52.4	14.0	9.7	11.8	33.3	33.3	6.9	14.3	27.7
Artillery	11.5	23.8	27.9	3.2	5.9	11.1	13.3	3.4	19.0	13.9
APC	3.8	0	0	3.2	0	0	0	0	4.8	1.7
Infantry	3.8	0	39.5	51.6	29.4	0	0	55.2	28.6	26.1
LAW	7.7	0	4.7	3.2	5.9	11.1	6.7	13.8	0	5.9
90mm	7.7	4.8	2.3	16.1	5.9	33.3	13.3	3.4	4.8	8.0
Grenade	Not played in the forecasting exercises.									

DISCUSSION

As part of ARI's engagement simulation research, an evaluation system for unit performance during two-sided tactical operations is being developed to help determine the unit's combat readiness and/or training deficiencies and proficiencies. To make this system criterion-referenced, performance benchmarks must be defined. The present modeling effort, the Combat Operations Training Effectiveness Analysis Model (COTEAM), uses the concept of situation-specific forecasting to provide performance benchmarks. The aim is to generate expectations about casualties and tactical processes and to compare ES exercise outcomes with these expectations to help estimate deficiencies and/or readiness levels. If empirical validity can be established for the expectation generation procedure, then the expectations generated should agree with the observed values from the ES combat test bed. This procedure can then be used to determine benchmarks and distributions of outcomes to which the observed ES outcomes can be compared.

In the present study, the Fort Carson Forecasting Game was used to generate expectations. Using scenarios as similar as possible to those used in the field exercises, Army officers played the forecasting game. The maneuver routes and casualty data from the field and forecasting exercises are comparable; the few differences are small and fairly well explained in retrospect. If the forecasting and field exercises were more closely matched (i.e., identical) and controlled, the forecasting data would be even more similar to the field data.

A brief overview of all the exercise maps suggests that the major difference between forecast and field maneuver routes is that the field exercise routes are more complex. The field maneuver routes show more "split points," i.e., places where forces separated onto different paths (compare the attacking forces for field and forecast exercises 1, 2, 3, 4, and 5), and more wandering or looping about (compare field and forecasting exercises 1, 2, and 5). This result could be due partly to the procedures used to construct the maneuver routes. In the forecasting game, the players traced their routes as they moved; in the field exercises, 18 data collectors followed assigned sections of the forces (e.g., one followed the attacking heavy tank section, one accompanied a TOW, etc.) and mapped their routes onto 1:25,000 maps. These routes were then transferred to a 1:3,125 map to be coded and interpreted and to clarify discrepancies.

An alternative, or adjunct, interpretation of this result is that during the game each player knew where all of his forces were and could keep them together, organized, moving on their maneuver routes, and focused on the objective. During the field exercises, however, the company/team commander could not control his forces as closely. His forces, and particularly the infantry, tended to lose contact with the other elements of the team and wandered about without much direction or purpose. For instance, if the infantry heard a vehicle nearby, they would race off to that vehicle regardless of their ultimate objective.

Over all exercises, and considering there is only one example of each field exercise and one example of each forecasting game, the maneuver routes seem comparable. The next step in the validation procedure is to give the maneuver maps of observed and forecast exercises (along with other data, such as casualties) to military experts and ask them to state whether a particular set of data is field exercise data or forecasting data from the game. If they cannot accurately determine which exercises are real and which are simulated, then the two types of data are assumed to be from the same distribution of outcomes. If they can distinguish between the two data sources, then efforts will be directed at determining how the experts could tell the difference. Was it the complexity of the maneuver routes? Was it the defensive positions taken? Was it the reactions of the forces to encountering opposition? In-depth interviews and questionnaires will attempt to discern those aspects of the maneuver routes that are different between the observed and forecasted exercises.

In the casualty data, only two differences of any magnitude were encountered--the greater casualty-inflicting ability of the tank in the forecasting procedure and the greater lethality of artillery in the field exercise. Both of these discrepancies were partially explained by differences in the procedures used in the field and in the game. Further refinement of these two areas is warranted.

Particular attention should be paid to the indirect fire procedures used in future ES exercises. The data may be interpreted to suggest that the firemarkers who delivered the artillery may have had a tendency to head toward vehicles and/or personnel to drop the artillery simulators instead of delivering the fire where it was directed. Another possibility is that assessing casualties caused by indirect fire is a difficult and inaccurate procedure. The data may also be interpreted to suggest that game players were not able to pinpoint the opposition as precisely as participants in the field exercises were.

The discrepancy in casualties inflicted by tanks is primarily due to the difference in number of infantry kills by tanks in the game and in the field. In the forecasting game, antipersonnel tank shells were permitted and used effectively to neutralize opposing infantry. The REAL-TRAIN exercises did not allow antipersonnel shells. These tanks were not encouraged to fire on personnel and, in fact, did not often fire on infantry. This subtle pressure to discourage tanks from firing on infantry probably was due to the difficulty of assessing casualties, particularly infantry, produced by tank antipersonnel shells. In future forecasting efforts, great care must be taken to insure that all variables in the field exercises are carefully, accurately, and completely replicated in the forecasting exercises. Even minor differences in rules, weapon effects, weather, OPORDS, or other variables could cause the forecasting procedure to provide inaccurate expectations.

The first step in validating a forecasting procedure, therefore, seems to be successful. Because of the severe restrictions on sample size, no inferential statistics could be conducted; even if it were

possible to perform some statistical tests, the results might have been misleading. It is not important if there are any "significant differences," statistically speaking; it is important that the forecasting procedure generates expectations that are not significantly different, to an information processor, from the outcomes observed in field exercises. If military experts cannot distinguish between generated outcomes and observed outcomes, and if they cannot distinguish between the two sets of process data collected during the exercises prior to the final outcomes, then is it relevant to the validity of the forecasting procedure that there are "significant differences" between the two types of data?

The next step in the validation process is to provide military experts with process (maneuver routes) data and product (casualty) data from forecast exercises and field exercises. If the experts cannot tell which data are generated by the game and which are observed in the field, then, to an information processor, the data are the same, and the data sources are indistinguishable. If the experts can tell which data are generated, then detailed interviews should be conducted with the experts to determine what aspects of the forecasting data indicated that it was not observed field exercise data. The information is used to redesign the forecasting procedures, and the validation procedure is conducted on the revised forecasting procedure. This iterative process continues until the forecasting technique is empirically validated against ES outcomes. When a forecasting procedure is validated, the technique will be used to create a distribution of outcomes, a benchmark, to which ES outcomes can be compared. In this manner, the ES evaluation system will become criterion-referenced, and unit performance in tactical operations can be evaluated systematically and scientifically.

Once the forecasting procedure is validated, further research in this direction should attempt to determine what additional information about tactical behavior the military experts need to distinguish between generated and observed data. These data may include fire patterns of vehicles, indirect fire placement, communication, or various other sources. Learning what additional data are necessary for the experts to be able to differentiate between forecast and observed data will lead to a better understanding of the dynamics of tactical behavior and development of an improved basis for revision of board simulations to match field exercises.

APPENDIX A. FORT CARSON GAME RULES

Order of Events-

Pre-Game

1. Issue OPORD
2. Assign force mix.
3. Establish weather conditions.
4. Planning by players (using maps only)
   - (a) Plan of attack
   - (b) Indirect fire
   - (c) Assemble at assembly area (on board game)

In each time period of the game

1. Firing
   - (a) casualty assessment
   - (b) signature detection
2. Movement
   - (a) Cues, if any
   - (b) Opportunity fire

     Casualty assessment
     Signature detection
3. Indirect fire
   - (a) Casualty assessment
   - (b) Adjust smoke screen

Fort Carson Game Rules*

Movement rates (in hexes per minute);
-50 meters per hex-

Terrain	Vehicles	Infantry
Road	8	2
Open, clear terrain	5	2
Trails, Streambeds (dry)	5	2
Incline	2	1
Forest	1	1
Soft or marshy ground	1	1

Special movement conditions:

1. Vehicles cannot climb Peanut Hill or North Hill.

2. Vehicles can enter streambeds only at road-stream junctions or at the end of a stream. It takes one minute of game time to enter or leave a streambed even at these places.

3. Inclement weather (rain, snow) decreases vehicle movement rates to 6, 3, 3, 1, 1, and 0. Depending upon the severity of the weather (a controller judgement made prior to game play when describing weather conditions), streambeds may be impossible for vehicles and/or infantry.

4. Not more than two vehicles may occupy the same hex at any time.

*All rules are subject to change at controllers' discretion.

Fort Carson Game Rules

Detection distances (in hexes):
-50 meters per hex-

Rate of Travel (hexes/min)	Vehicles			Infantry			
	Track	Mech Plt	Tnk Plt	1	3	fire team	squad
In woods-							
0	1	2	2	0	0	0	0
1	2	4	4	1	1	1	1
Edge of woods-	3	6	6	1	1	1	1
Open, clear terrain or road-							
0	30	40	40	2	3	4	6
1	35	50	50	11	13	15	19
2	40	60	60	21	23	25	29
5	50	70	70	--	--	--	--
8	60	80	80	--	--	--	--

Special detection rules:

1. Sightings must follow line of sight rulings by controller. Distances may be decreased by factor of 2 or 4, depending on weather conditions specified by controller prior to game play.

2. Auditory clues must be exercised cautiously. No auditory clues, except loud firings, should be given to moving vehicles with motors running.

3. Sightings from high places must be determined by controller, who considers distance, intervening terrain, visibility, etc.

4. Only hexes directly adjacent to streambeds may see into the streambed and personnel in the streambed may not see out of the streambed.

5. Any type of motion by a possible detecting unit decreases the detection distance by ½, except for auditory clues as noted in 2.

6. Personnel able to receive auditory clues may not receive these clues if friendly vehicles are moving or have motors running within 1 or 2 hexes of the observer.

Fort Carson Game Rules

Range of weapons (in hexes): -50 meters per hex-	Maximum Effective Range
M-16	6
M-60	12
TOW	60
LAW	4
DRAGON	20
TANK	40
155mm	292
Claymores	1
Grenade	1
50 cal.	32
90mm recoilless rifle	8

Terrain & weather conditions may dictate smaller ranges than indicated above.

Fort Carson Game Rules

Rules governing firing:

1. Units can fire only if line of sight to the target is available.

2. Units cannot fire and move in the same minute.

3. Units can fire only within the range and at the rate of their weapon's capabilities.

4. If two opposing forces detect each other simultaneously, one force is randomly selected to fire first. If the second force is not destroyed, it may then fire or move, at that player's discretion.

5. If a stationary unit detects a moving unit and is able to fire, the stationary unit may conduct an opportunity fire at the end of that time period (if the stationary unit does not move during that time period). An opportunity fire may be conducted regardless of whether or not the moving target is out of sight by the end of that time period.

6. Hit and casualty probabilities are determined from Kinton's chart and assessed according to REALTRAIN rules. The probability of detecting a weapon's signature is also determined from Kinton's probability chart. If a signature is detected, that unit may be fired upon by the detecting unit (provided the detecting unit does not move during that time period).

Fort Carson Game Rules

Kill characteristics:
(using Kinton's probability tables)

TANK
TOW (DRAGON) anything hit & all personnel within 10 meters
106 recoilless rifle are destroyed

90mm recoilless rifle - destroys vehicles and personnel within 5 meters; first hit on tank destroys mobility, comm, ½ of personnel, second hit kills tank

LAW - 3 hits on tank, loses mobility, then commo., then everything. Two hits on vehicles, first hit kills half of personnel.

Grenade - 5 meter kill range

AT - 10 meter kill range

Claymore - 15 - 20 meter kill range

81mm mortar (1) - All personnel within two hexes are killed

Artillery - 1 hex, tank immobilized, all else destroyed;
2 hexes, lose commo., personnel killed;

4.2" mortar - 1 hex, lose commo., personnel destroyed;
2 hexes, personnel destroyed

(1) Note: REALTRAIN does not use probabilities to assess indirect fire casualties, these occur with probability 1.

Note: The kill characteristics depend upon obstacles (trees, hills, etc.) between weapon and target.

Indirect fire:

1. Preplanned fire with a specific time period indicated is delivered at the end of that time frame.

2. Preplanned fire without a specific time indicated is delivered two minutes after it is requested.

3. Opportunity fire, new coordinates given during the engagement, is delivered three minutes after it is requested.

4. Adjustments on previous fires of above types are delivered one minute after they are requested.

5. On command fire, new coordinates given during the engagement but not fired upon until a request for fire is made, is delivered one minute after it is requested. (Note that a three minute delay must occur after the new coordinates are given before a request for fire may be given.) Any request for fire that occurs before on command fire is requested (but after the on command coordinates are given) cancels the on command fire and coordinates.

6. Only one indirect fire delivery can occur per minute.

7. Neither force may exceed its indirect fire allowance.

8. One-third of each force's indirect fire allowance is smoke.

9. The placement of indirect fire is given in a single six-digit coordinate that is converted to hex numbers by the controller/data collector, who then passes the hex number on to the senior controller. The senior controller "splashes" the indirect fire at the end of the appropriate time frame and assesses casualties.

10. The placement of smoke is given in two adjacent six-digit coordinates. These coordinates indicate the front of the smoke screen. The controller/data collector converts these coordinates to hex numbers and passes the hex numbers on to the senior controller, who impacts the smoke and assesses its movement as a function of the prevailing weather conditions. If the wind is 20 knots or greater, the smoke is blown away and has no effect. If there is no wind, the smoke screen covers the impact hexes (only) for ten minutes of game time. A flanking wind relative to the smoke screen front produces a linear screen of narrow width but great length. (Place smoke in the four impact hexes, then for each of the next four minutes place smoke in the next adjacent hexes in the direction of wind flow.) A quartering, head, or tail wind relative to the smoke screen front produces a wide, but not very long smoke screen. (Place smoke in the four impact hexes, then for each of the next four minutes place smoke in the adjacent four hexes in the direction of wind flow.) After all the appropriate

smoke markers have been laid, start removing them in the same order in which they were laid; beginning with the impact hexes, remove one set of smoke markers at the end of each minute of game time.

APPENDIX B. DESCRIPTION OF EXERCISES AND OPORDS

OPORD 30 Offense N/S lane, Exercises 1 & 3

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 AR

TM Armor

C/4-40 AR (-)
1/A/1-8 Inf
TOW Sec B/1-8 Inf
FIST (-) C/1-8 Inf

CO B

B/4-40 AR
FIST (-)

TM Mech

CSC/1-8 Inf (-)
1/C/4-40 AR
FIST (-) CSC/1-8 Inf
TOW Sec CSC/1-8 Inf

TF CON

A/1-45 Arty DS/O/OGS
(155 Sp)
AVLB (GS)
Hvy Mtr (GS)
REDEYE (-) (GS)
FIST (-) (GS)
Scts (-) (GS)
Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Enemy Mech/Armor units have been observed in the vicinity of 075700 and are preparing defensive positions along the ridge-line from 062695 to 073680.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A 1/45 Arty

c. Attachment and Detachments: Scts to 1st Bde TF Con

2. Mission: Task force 4/40 will attack H-Hour, D-Day to seize and secure the high ground in the vicinity of 068688. 0/0 continue the attack south.

3. Execution:

a. Concept of operation:

(1) Maneuver: Task force 4/40 Armor presently located at 104719 will conduct offensive operations H-Hour D-Day to secure the high ground in the vicinity of 068688. Presently friendly forces are occupying the LD. Team elements will maneuver along axis MID to seize and secure objective APPLE. Once the objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Mech, fire support ASR is 49 H.E. and 3 Smoke missions.

b. Team Mech attacks along axis MID and secures objective from 12 to 4 o'clock.

c. Company B attacks along axis MID following Team Mech and secures objective from 8 to 12 o'clock.

d. Team Armor attacks along axis MID following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains and MSR, in that order.

h. GRD SVR RDR (GS) - Task force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

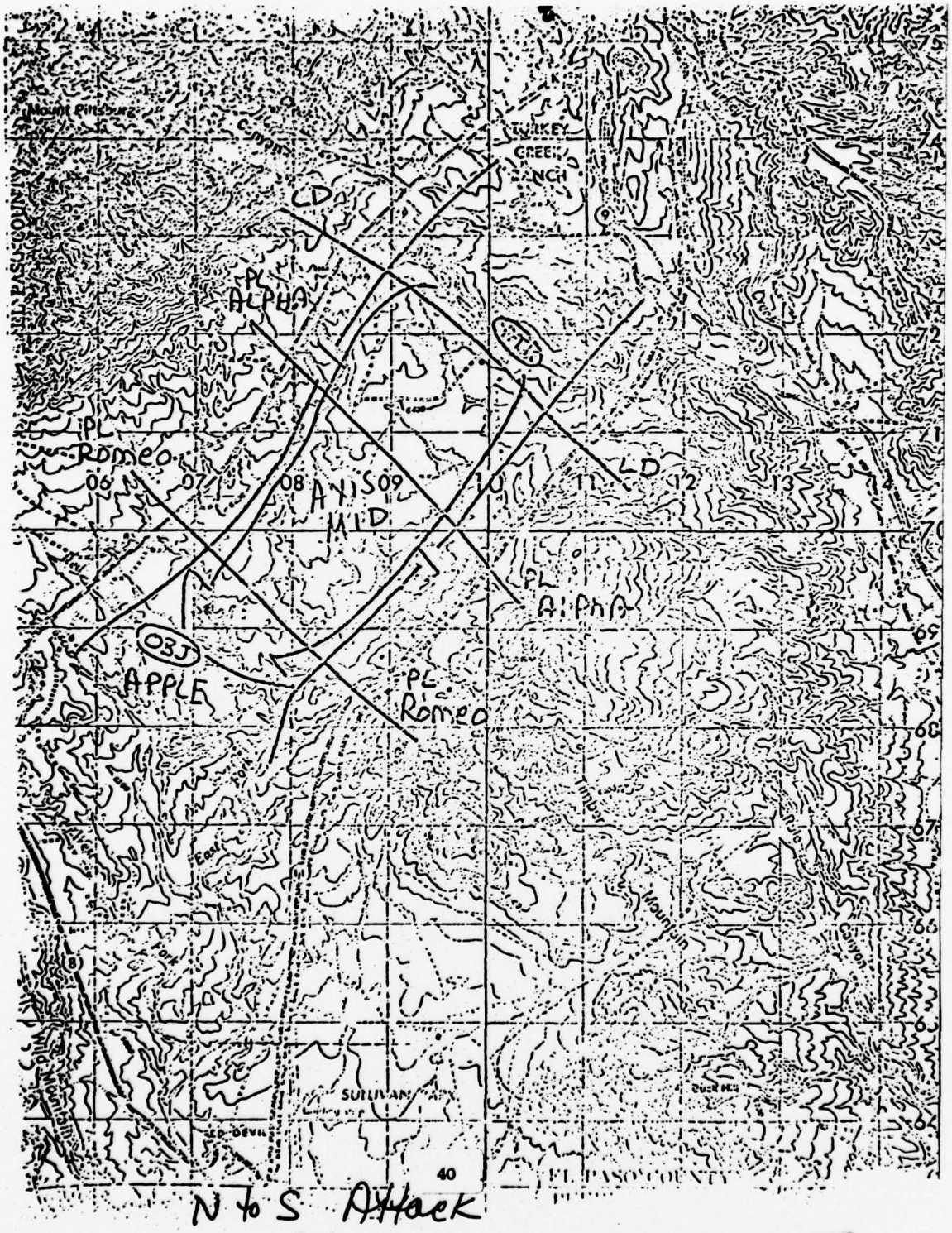
b. Command:

(1) Bn TOC will be initially located at 100726.

(2) Command will follow Team A in the attack.

Acknowledge

L. JACKSON
Commanding



N to S Attack

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OPORD 40 Defense N/S lane, Exercises 1 & 3

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor	TM Mech
C/4-40 Ar (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 Ar
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 Ar	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Have been attacking from the north in an effort to seize Pueblo. They have been located in grid square 0972 and are expected to continue their attack along Hwy 115.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A/1-45 Arty

c. Attachments and Detachments: Scts to 1st Bde Task Force Control

2. Mission:

TF 4/40 Armor defends in sector from H-Hour D-Day O/O implement plan green.

3. Execution:

a. Concept of operations:

(1) Maneuver: Task Force 4/40 defends in sector with Company B in the west, Team Mech/Armor in the center and Team Mech/Armor in the east.

(2) Fire Support: Priority of fire to Team Mech/Armor.

b. Team: Mech/Armor

Defend in sector, vic 063693 to 078680 in the center, 0/0 implement plan green.

c. Company B:

Defend in sector vic 063693 to 050710 in the west 0/0 implement plan green.

d. Team: Mech/Armor

Defend in sector vic 078680 to 090670 in the east 0/0 implement plan green.

e. Scout PLT (GS):

Scout left flank and report any enemy contact.

f. Hv Mort Plt (GS):

Task Force Control priority of fires to CO B.

g. REDEYE CS to task force control priorities to Trains, TOC, and MSR in that order.

h. Ground Svr Radar (GS) Task force control 0/0 be prepared to screen forward of the FEBA.

i. AVLB (GS): Task force control 0/0 bridge any waterways/gulches.

j. A/1-45 Arty DS 0/0 GS priority of fires to Mech/Armor. ASR will be 49 HE and 3 smoke missions.

k. Reserves: None

l. Coordinating Instructions:

(1) Maintain enemy contact once established

(2) 0/0 implement plan green

(3) TM Cdrs must provide screening forces forward of the FEBA.

(4) Direct coordination with elements on flanks authorized.

(5) All task force control elements per SOP.

4. Service Support

a. Resupply daily 1600 all classes

b. Report casualties to TF TOC and Evac to Bde medical sector

c. Evac all POW to Bde holding compound.

5. Command and Signal

a. Signal

(1) Current CEOI in effect.

(2) Yellow and Violet Smoke for signalling authorized.

b. Command: Bde Command CP initially in vic 068682

Acknowledge.

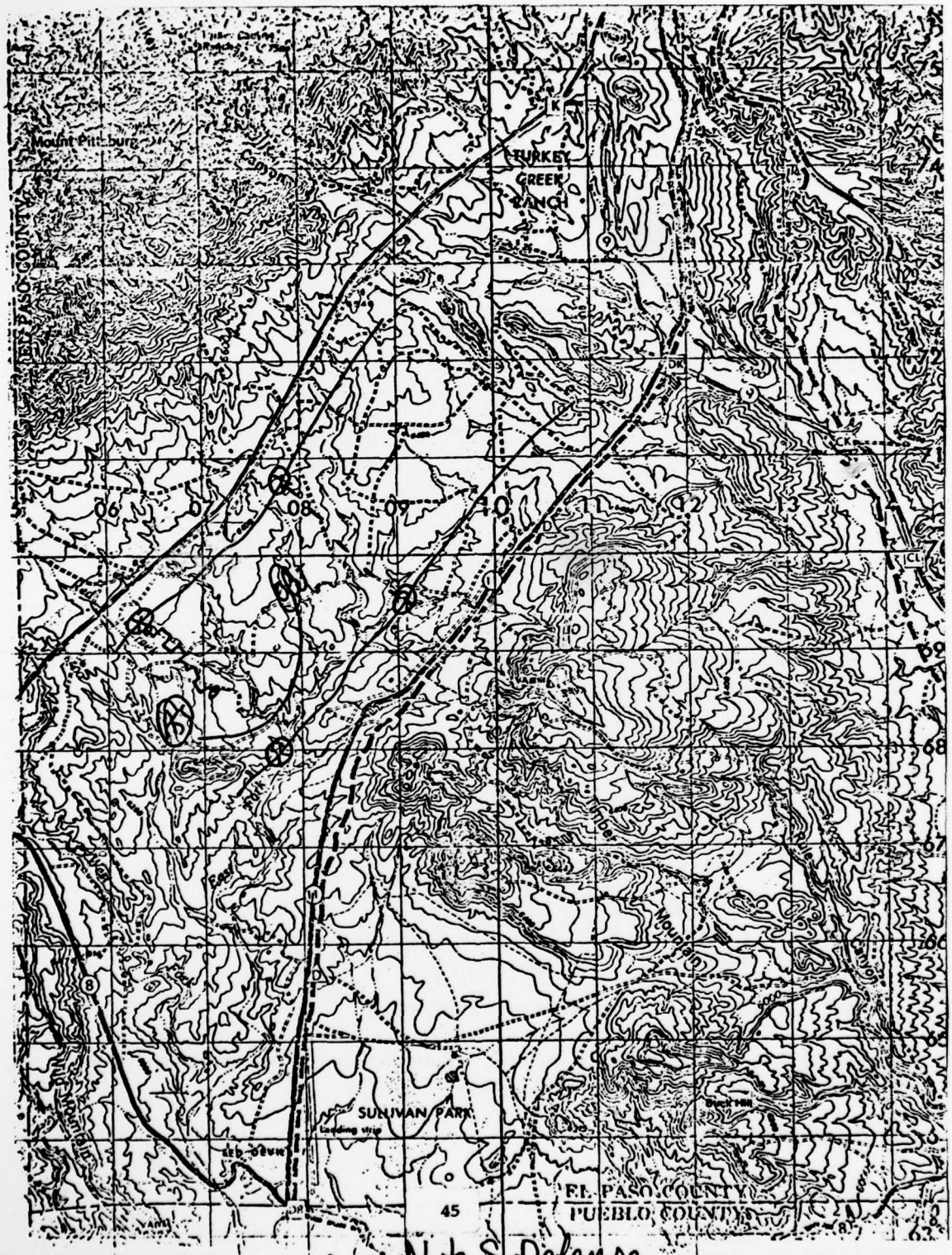
B. E. MIDDLETON
Commanding

Annexes:

A - Plan Green

ANNEX A - Counterattack Plan Green

On order, Commanders will withdraw a heavy tank section and one infantry squad to the rear of the defensive position and utilize this force as the counterattacking force for plan green. Counterattack must be a sweeping flank attack.



N to S Defense

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OPORD 10 Offense S/N lane, Exercises 2 & 4

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor	TM Mech
C/4-40 AR (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 Ar	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation

a. *Enemy forces: Enemy armored forces have been delaying in sector* and establishing defensive positions in the vicinity of Agony Ridge for the past four days.

b. Friendly forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) 1/45 Arty

c. Attachment & Detachments: Task Org.

2. Mission: TF 4/40 Armor attack H-Hour D-Day to secure high ground vicinity 092723. 0/0 continue to attack north.

3. Execution:

a. Concept of operation

(1) Maneuver: Task force 4/40 Armor will conduct offensive operations to secure the high ground in the vicinity of 092723. Once the

objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support. Priority of fires to Team Mech/Armor, fire support ASR is 49 H.E. and 3 Smoke missions.

b. Team Mech/Armor attack along axis RED and secure objective from 12 to 4 o'clock.

c. Company B attacks along axis RED following Team Mech/Armor and secures objective from 8 to 12 o'clock.

d. Team Mech/Armor attacks along axis RED following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task Force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

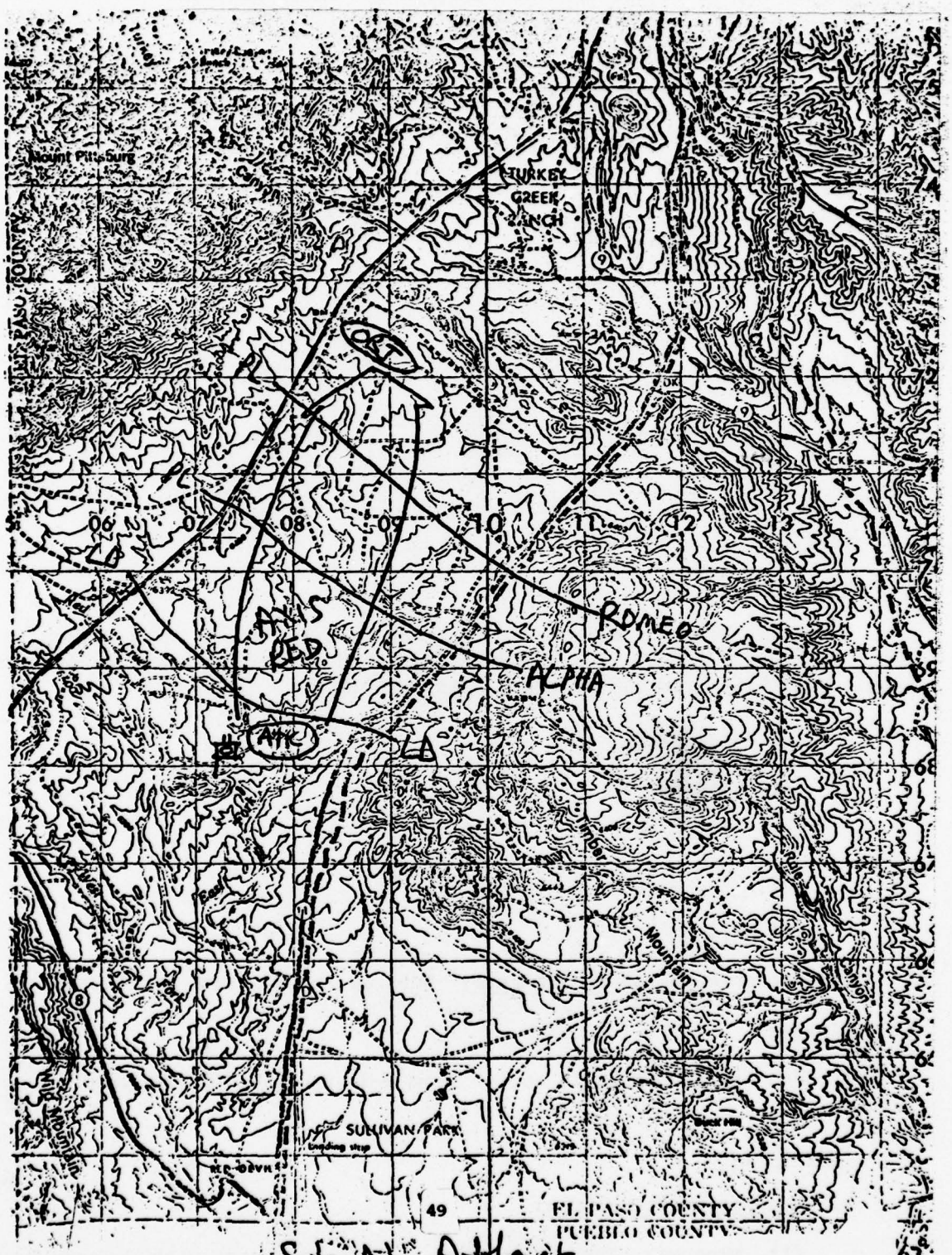
b. Command:

(1) Bn TOC will be initially located at 071679.

(2) Command will follow Team A in the attack.

Acknowledge

L. JACKSON
Commanding



S to N Attack

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OPORD 20 Defense S/N lane, Exercises 2 & 4

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

Tm Armor

C/4-40 Ar (-)
1/A/1-8 Inf
TOW Sec B/1-8 Inf
FIST (-) C/1-8 Inf

TM Mech

CSC/1-8 Inf (-)
1/C/4-40 Ar
FIST (-) CSC/1-8 Inf
TOW Sec CSC/1-8 Inf

CO B

B/4-40 Ar
FIST (-)

TF CON

A/1-45 Arty DS/O/OGS
(155 Sp)
AVLB (GS)
Hvy Mtr (GS)
REDEYE (-) (GS)
FIST (-) (GS)
Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Have been attacking from the south in an effort to seize Colorado Springs. The attack is expected to continue within 24 hours in vic Hill 6465 grid 068680 along axis Hwy 115.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A/1-45 Arty

c. Attachments and Detachments: Scts to 1st Bde Task Force Control

2. Mission:

TF 4/40 Armor defends in sector from H-Hour D-Day 0/0 implement green plan.

3. Execution:

a. Concept of operations:

(1) Maneuver: Task Force 4/40 defends in sector with Company B in the west, Team Mech/Armor in the center and Team Mech/Armor in the east.

(2) Fire Support: Priority of fire to Team Mech/Armor

Defend in sector, vic 086726 to 092723 in the center, O/O implement plan green.

c. Company B:

Defend in sector vic 086727 to 080730 in the west O/O implement plan green.

d. Team Mech/Armor:

Defend in sector vic 092723 to 111711 in the east O/O implement plan green.

e. Scout PLT (GS):

Scout left flank and report any enemy contact.

f. Hv Mort Plt (GS):

Task Force Control priority of fires to CO B.

g. REDEYE CS to task force control priorities to Trains, TOC, and MSR in that order.

h. Ground Svr Radar (GS) Task force control O/O be prepared to screen forward of the FEBA.

i. AVLB (GS): Task force control O/O bridge any waterways/gulches.

j. A/1-45 Arty DS O/O GS priority of fires to Mech/Armor. ASR will be 49 HE and 3 smoke missions.

k. Reserves: None

l. Coordinating Instructions

(1) Maintain enemy contact once established

(2) O/O implement plan green

(3) TM Cdrs must provide screening forces

(4) Direct coordination with elements on flanks authorized

(5) All task force control elements per SOP.

4. Service Support

a. Resupply daily 1600 all classes

b. Report casualties to TF TOC and Evac to Bde medical sector

c. Evac all POW to Bde holding compound.

5. Command and Signal

a. Signal

(1) Current CEOI in effect.

(2) Yellow and Violet Smoke for signalling authorized.

b. Command: Bde Command CP initially in vic 094728.

Acknowledge.

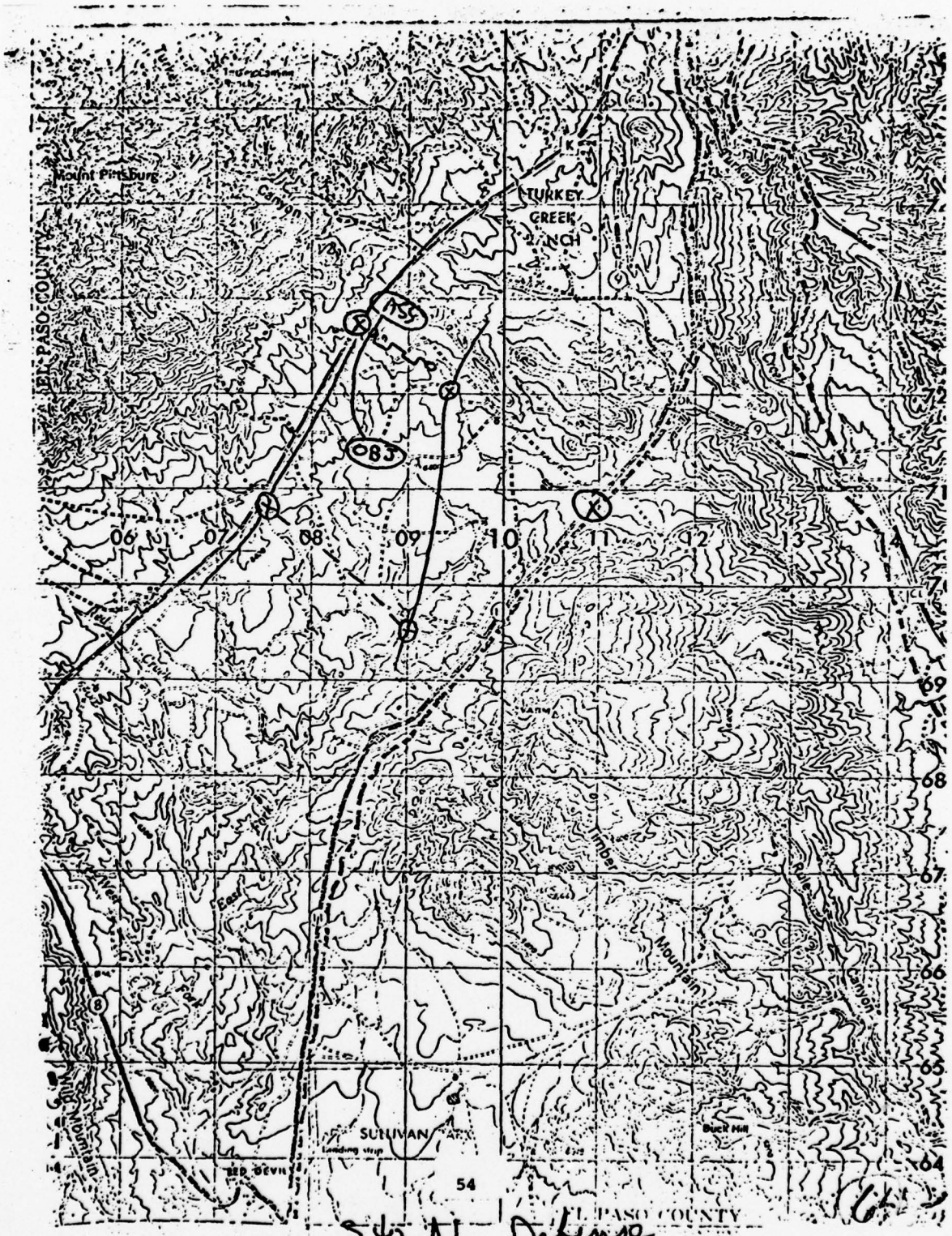
B. E. MIDDLETON
Commanding

Annexes:

A - Plan Green

ANNEX A - Counterattack Plan Green

On order, Commanders will withdraw a heavy tank section and one infantry squad to the rear of the defensive position and utilize this force as the counterattacking force for plan green. Counterattack must be a sweeping flank attack..



540 N Defense

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OPORD 10 Offense S/N lane, Exercise 5

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor	TM Mech
C/4-40 AR (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 Ar	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation

a. Enemy forces: Enemy armored forces have been delaying in sector and establishing defensive positions in the vicinity of Agony Ridge for the past four days.

b. Friendly forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) 1/45 Arty

c. Attachment & Detachments: Task Org.

2. Mission: TF 4/40 Armor attack H-Hour D-Day to secure high ground vicinity 079709. 0/0 continue the attack north.

3. Execution:

a. Concept of operation

(1) Maneuver: Task force 4/40 Armor will conduct offensive

operations to secure the high ground in the vicinity of 079709. Once the objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Mech, fire support ASR is 49 H.E. and 3 Smoke missions.

b. Team Mech attack along axis RED and secure objective from 12 to 4 o'clock.

c. Company B attacks along axis RED following Team Mech and secures objective from 8 to 12 o'clock.

d. Team Armor attacks along axis RED following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task Force control 0/0 be prepared to screen to the front of the objective once secured.

i. ALVB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

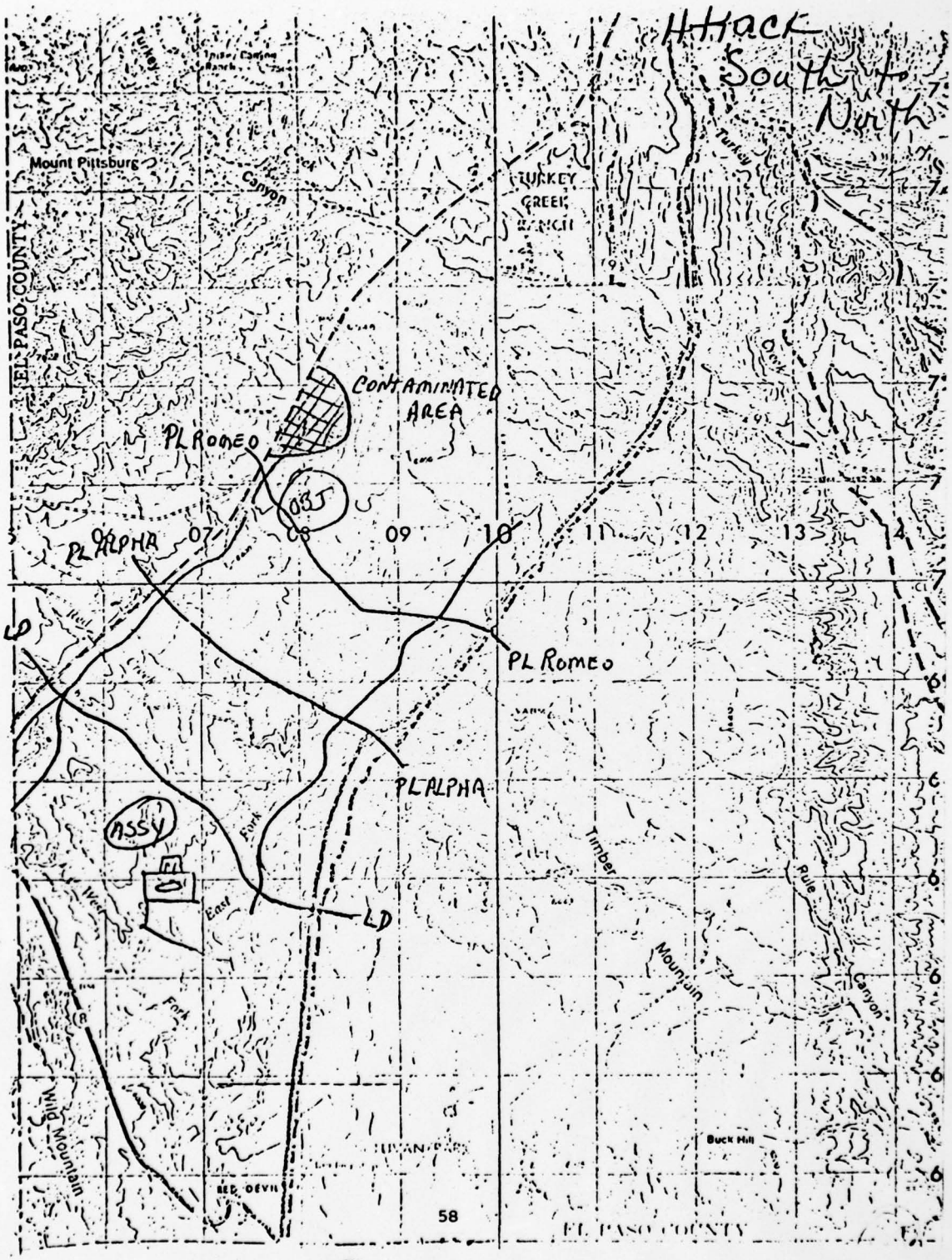
b. Command:

(1) Bn TOC will be initially located at 072677

(2) Command will follow Team Armor in the attack.

Acknowledge

L. JACKSON
Commanding



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OPORD 30 Offense N/S lane, Exercise 5

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 AR

TM Armor	TM Mech
C/4-40 AR (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 AR	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Enemy Mech/Armor units have been observed in the vicinity of 056682.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A 1/45 Arty

c. Attachment and Detachments: Scts to 1st Bde TF Con

2. Mission: Task force 4/40 will attack H-Hour, D-Day to seize and secure the high ground in the vicinity of 056682 0/0 continue the attack south.

3. Execution:

a. Concept of operation:

(1) Maneuver: Task force 4/40 Armor presently located at 082708 will conduct offensive operations H-Hour D-Day to secure the high ground in the vicinity of 056682. Presently friendly forces are occupying the LD.

Team elements will maneuver along axis MID to seize and secure objective APPLE. Once the objective is secured Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Armor, fire support ASR is 49 H.E. and 3 Smoke missions.

b. Team Armor attack along axis MID and secure objective from 12 to 4 o'clock.

c. Company B attacks along axis MID following Team Armor and secures objective from 8 to 12 o'clock.

d. Team Mech attacks along axis MID following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

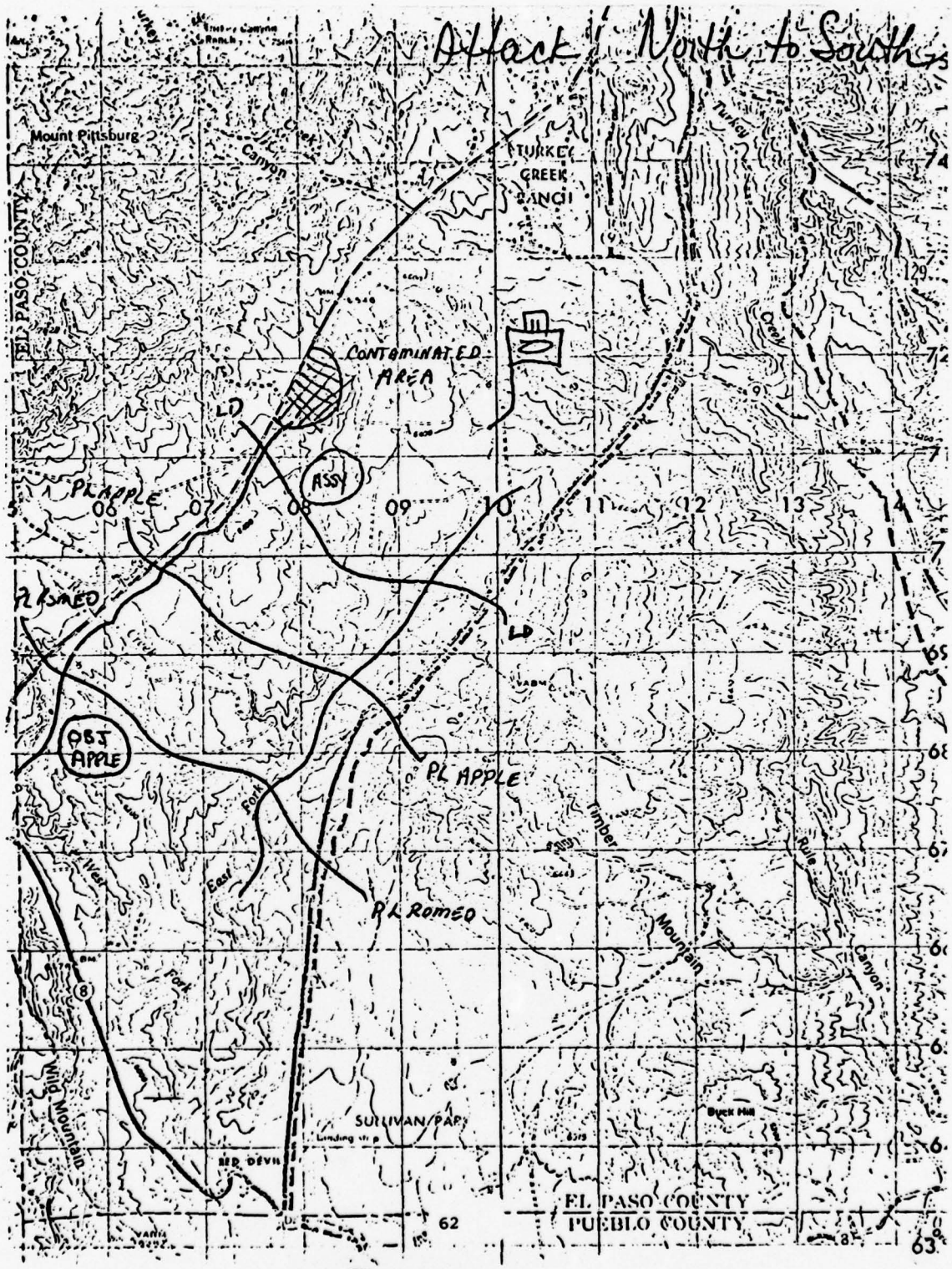
b. Command:

(1) Bn TOC will be initially located at 085716.

(2) Command will follow Team Mech in the attack.

Acknowledge.

L. JACKSON
Commanding



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OPORD 40 Defense N/S lane, Exercise 6

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor

C/4-40 Ar HQ
1/A/1-8 Inf
TOW Sec
FIST (-)

TM Mech

CSC/1-8 Inf (-)
1/C/4-40 Ar
FIST (-)
TOW Sec
2/C/4-40 Ar

CO B

B/4-40 Ar
FIST (-)

TF CON

A/1-45 Arty DS/O/OGS
(155 Sp)
AVLB (GS)
Hvy Mtr (GS)
REDEYE (-) (GS)
FIST (-) (GS)
Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Have been attacking from the north in an effort to seize Pueblo. They have been located in grid square 0972 and are expected to continue their attack along Hwy 115.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A/1-45 Arty

c. Attachments and Detachments: Scts to 1st Bde Task Force Control

2. Mission:

TF 4/40 Armor defends in sector from H-Hour D-Day.

3. Execution:

a. Concept of operations:

(1) Maneuver: Task Force 4/40 defends in sector with Company B in the west, Team Armor in the center and Team Mech in the east.

(2) Fire Support: Priority of fire to Team Armor.

b. Team Armor

Defend in sector vic 053688 to 063676 in the center.

c. Company B:

Defend in sector vic 045700 to 053688 in the west.

d. Team Mech

Defend in sector 063676 to 069660 in the east.

e. Scout Plt (GS):

Scout left flank and report any enemy contact.

f. Hv Mort Plt (GS):

Task Force Control priority of fires to CO B.

g. REDEYE GS to task force control priorities to Trains, TOC, and MSR, in that order.

h. Ground Svr Radar (GS) Task force control O/O be prepared to screen forward of the FEBA.

i. AVLB (GS): Task force control O/O bridge any waterways/gulches.

j. A/1-45 Arty DS O/O GS priority of fires to Team Armor. ASR will be 49 H.E. and 3 smoke missions.

k. Reserves: None

l. Coodinating Instructions:

(1) Maintain enemy contact once established

(2) TM Cdrs must provide screening forces forward of the FEBA

(3) No forces will operate forward of PL Turkey

(4) Direct coordination with elements on flanks authorized

(5) All task force control elements per SOP.

4. Service Support:

a. Resupply daily 1600 all classes

b. Report casualties to TF TOC and Evac to Bde medical sector

c. Evac all POW to Bde holding compound.

5. Command and Signal:

a. Signal

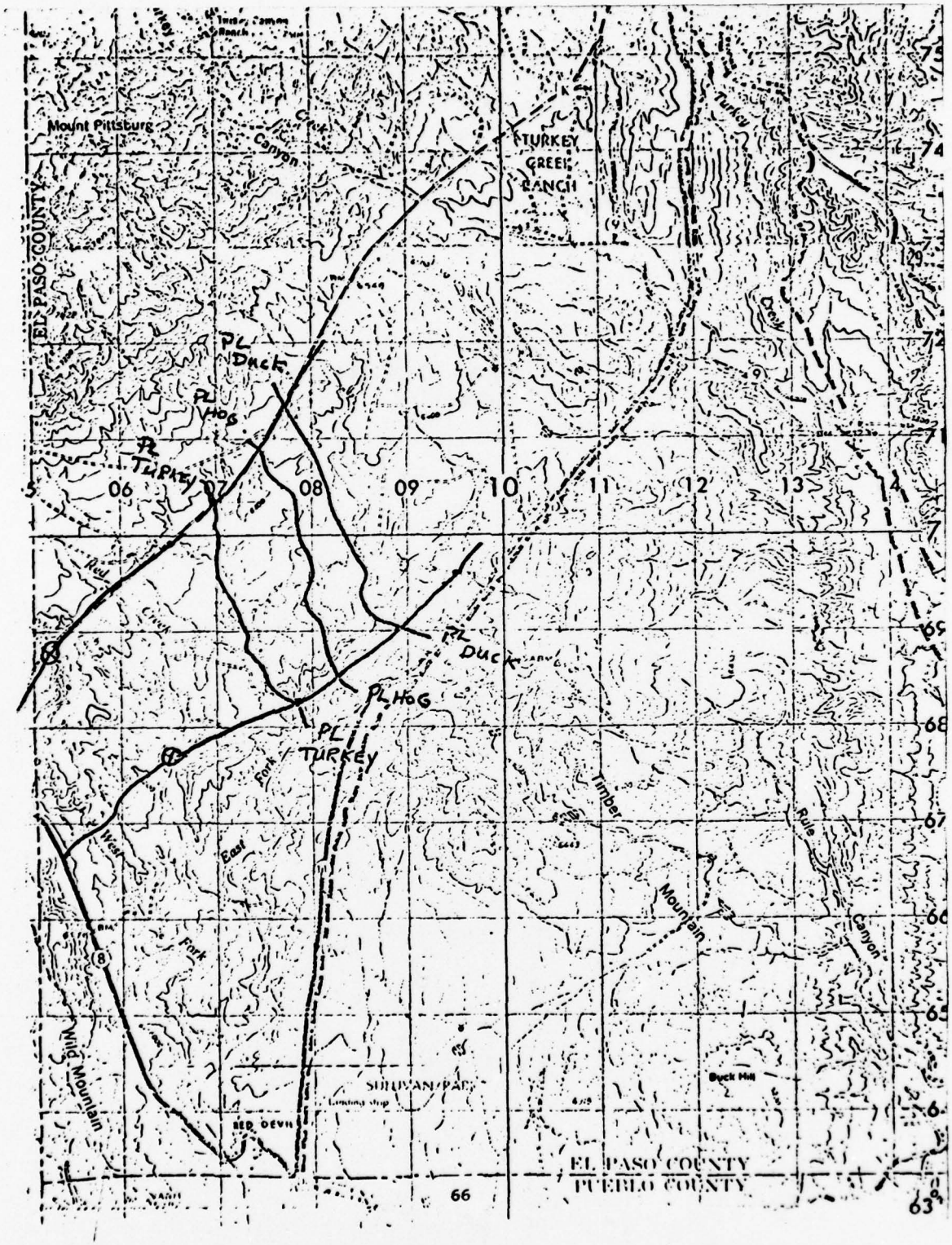
(1) Current CEOI in effect.

(2) Yellow and Violet Smoke for signalling authorized.

b. Command: Bde Command CP initially in vic 055675.

Acknowledge

B. E. MIDDLETON
Commanding



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OPORD 30 Offense N/S lane, Exercise 6

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 AR

TM Armor	TM Mech
C/4-40 AR HQ	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
	2/C/4-40
CO B	**TF CON**
B/4-40	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation:

a. Enemy Forces: Enemy Mech/Armor units have been observed in the vicinity of 050680 and are preparing defensive positions along the ridgeline from 050685 to 090675.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A 1/45 Arty

c. Attachment and Detachments: Scts to 1st Bde TF Con

2. Mission: Task force 4/40 will attack H-Hour, D-Day to seize and secure the high ground in the vicinity of 058682. 0/0 continue the attack southwest.

3. Execution:

a. Concept of operation:

(1) Maneuver: Task force 4/40 Armor presently located at 104719

will conduct offensive operations H-Hour D-Day to secure the high ground in the vicinity of 058682. Presently friendly forces are occupying the LD. Team elements will attack in zone to seize and secure objective APPLE. Once the objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team MECH, fire support ASR is H.E. 49 and 3 Smoke missions.

b. Team MECH attack in zone and secure objective from 12 to 4 o'clock.

c. Company B attacks in zone following Team MECH and secures objective from 8 to 12 o'clock.

d. Team Armor attacks in zone following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task Force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

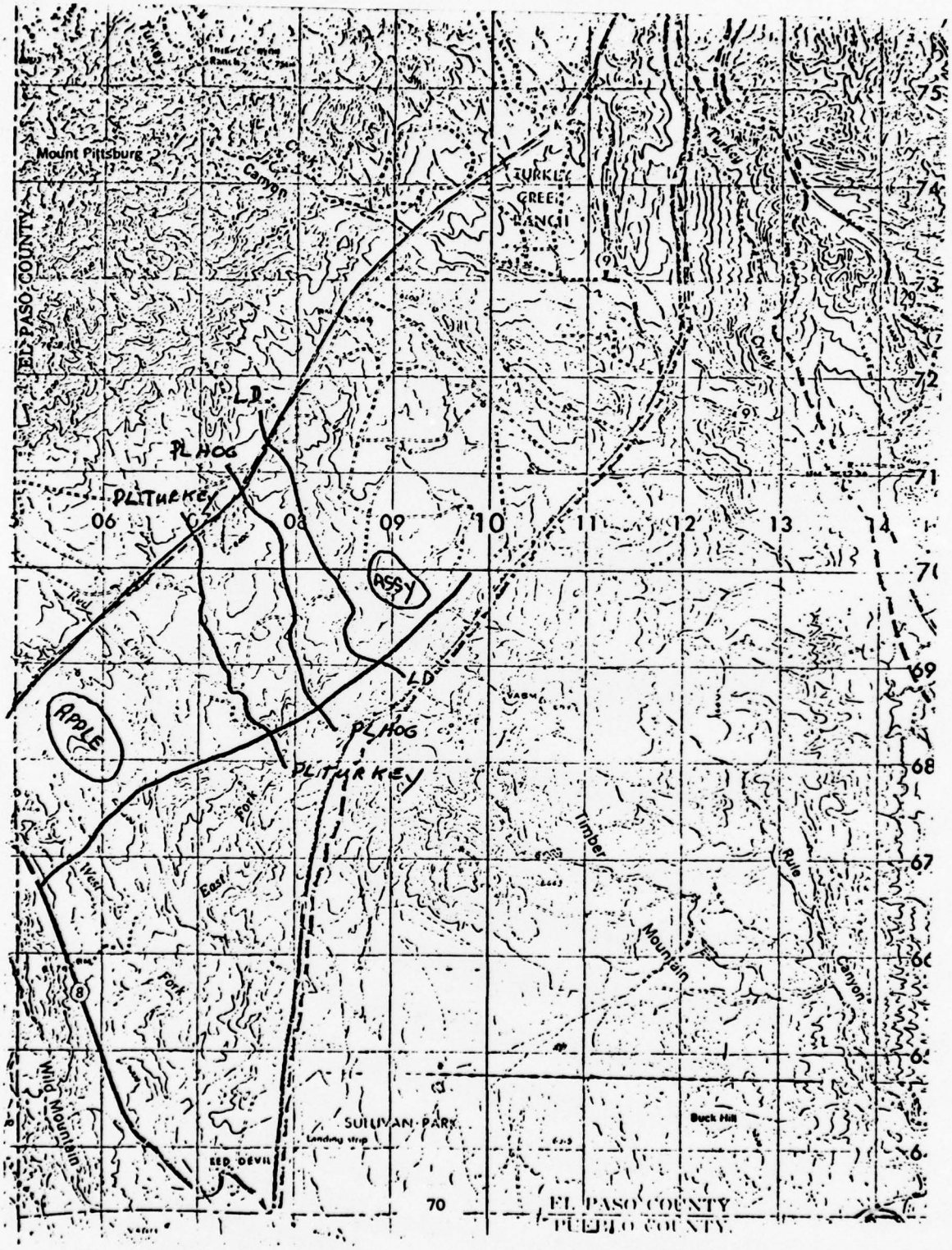
b. Command:

(1) Bn TOC will be initially located at 100726.

(2) Command will follow Team Armor in the attack.

Acknowledge

L. JACKSON
Commanding



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OPORD 10 Offense S/N lane, Exercise 8

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor

C/4-40 AR (-)
1/A/1-8 Inf
TOW Sec B/1-8 Inf
FIST (-) C/1-8 Inf

CO B

B/4-40 Ar
FIST (-)

TM Mech

CSC/1-8 Inf (-)
1/C/4-40 AR
FIST (-) CSC/1-8 Inf
TOW Sec CSC/1-8 Inf

TF CON

A/1-45 Arty DS/O/OGS
(155 Sp)
AVLB (GS)
Hvy Mtr (GS)
REDEYE (-) (GS)
FIST (-) (GS)
Scts (-) (GS)
Grd Srv Rdr (GS)

1. Situation

a. Enemy forces: Enemy armored forces have been delaying in sector and establishing defensive positions in the vicinity of Agony Ridge for the past four days.

b. Friendly forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) 1/45 Arty

c. Attachment & Detachments: Task Org.

2. Mission: TF 4/40 Armor attack H-Hour D-Day to secure high ground vicinity 074704. 0/0 continue the attack north.

3. Execution:

a. Concept of operation

(1) Maneuver: Task force 4/40 Armor will conduct offensive operations

to secure the high ground in the vicinity of 074704. Once the objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Armor. Fire support ASR is TBD and 3 Smoke missions.

b. Team Armor attack in zone and secure objective from 12 to 4 o'clock.

c. Company B attacks in zone following Team Armor and secures objective from 8 to 12 o'clock.

d. Team Mech attacks in zone following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, MSR, in that order.

h. GRD SVR RDR (GS) - Task Force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

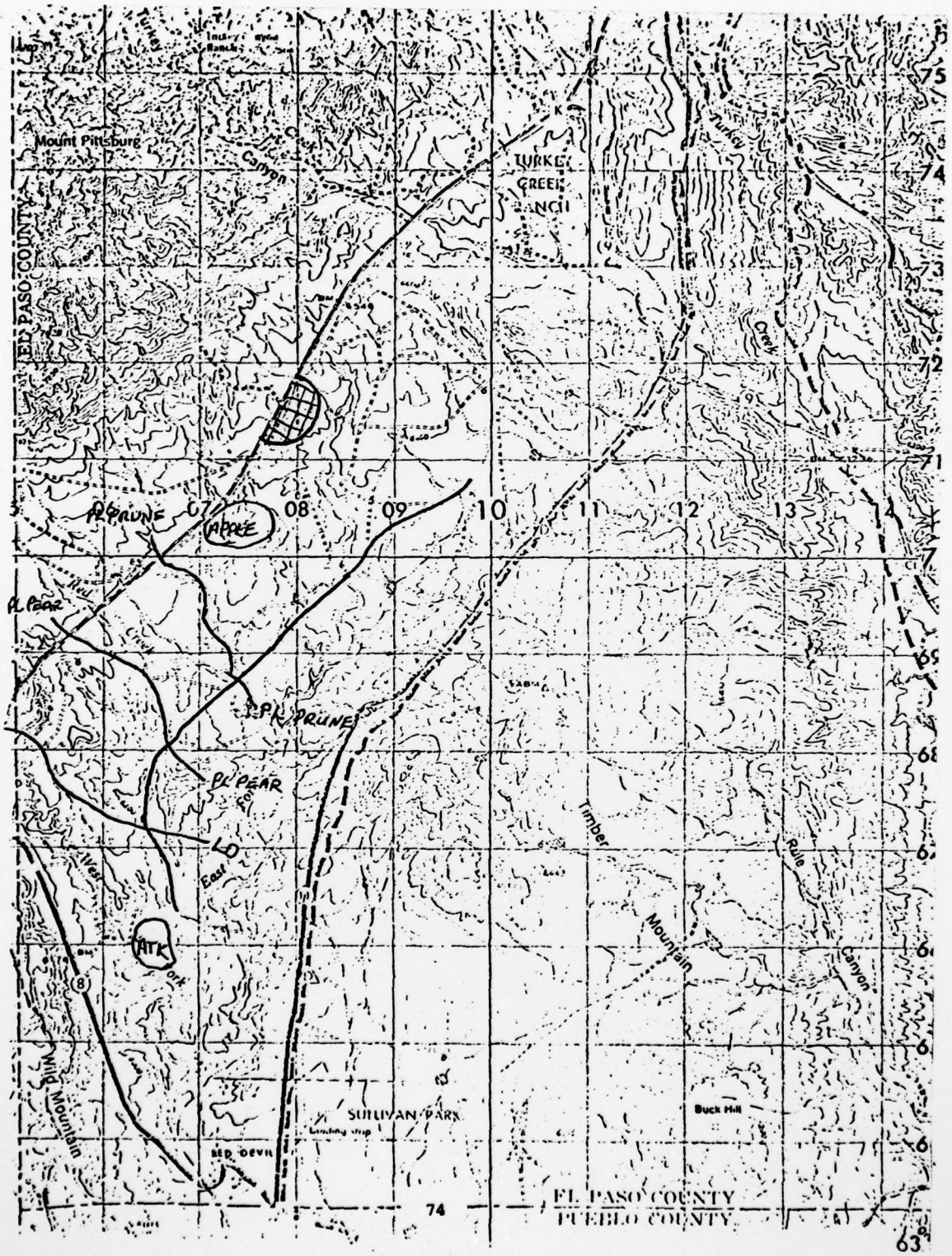
a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

b. Command:

(1) Bn CP will be initially located at 066656 and will follow Tm Armor.

Acknowledge

L. JACKSON
Commanding



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OPORD 20 Defense S/N lane, Exercise 8

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor

C/4-40 Ar (-)
1/A/1-8 Inf
TOW Sec B/1-8 Inf
FIST (-) C/1-8 Inf

TM Mech

CSC/1-8 Inf (-)
FIST (-) CSC/1-8 Inf
TOW Sec CSC/1-8 Inf

CO B

B/4-40 Ar
FIST (-)

TF CON

A/1-45 Arty DS/O/OGS
(155 Sp)
AVLB (GS)
Hvy Mtr (GS)
REDEYE (-) (GS)
FIST (-) (GS)
Grd Srv Rdr (GS)

1. Situation

a. Enemy Forces: Have been attacking from the south in an effort to seize Colorado Springs. The attack is expected to continue within 24 hours in vic Hill 6465 grid 068680 along axis Hwy 115.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A/1-45 Arty

c. Attachments and Detachments: Scts to 1st Bde Task Force Control

2. Mission:

TF 4/40 Armor defends in sector from H-Hour D-Day.

3. Execution:

a. Concept of operations:

(1) Maneuver Task Force 4/40 defends in sector with Company B in the west, Team Mech in the center and Team Armor in the east.

(2) Fire Support: Priority of fire to Team Mech

b. Team Mech

Defend in sector, vic 073707 to 080693 in the center.

c. Company B:

Defend in sector vic 060710 to 073707 in the west

d. Team Armor

Defend in sector vic 080693 to 091687 in the east.

e. Scout PLT (GS):

Scout left flank and report any enemy contact.

f. Hv Mort Plt (GS):

Task Force Control priority of fires to CO B.

g. REDEYE GS to task force control priorities to Trains, TOC, and MSR, in that order.

h. Ground Svr Radar (GS) Task Force Control O/O be prepared to screen forward of the FEBA.

i. AVLB (GS): Task Force Control O/O bridge any waterways/gulches.

j. A/1-45 Arty DS O/O GS priority of fires to Tm Mech. ASR will be 49 HE and 3 smoke missions.

k. Reserves: None

l. Coordinating Instructions

(1) Maintain enemy contact once established

(2) TM Cdrs must provide screening forces

(3) Direct coordination with elements on flanks authorized

(4) All task force control elements per SOP

(5) Do not place security forces forward of PL PRUNE.

4. <u>Service Support</u>

a. Resupply daily 1600 all classes

b. Report casualties to TF TOC and Evac to Bde medical sector

c. Evac all POW to Bde holding compound.

5. Command and Signal

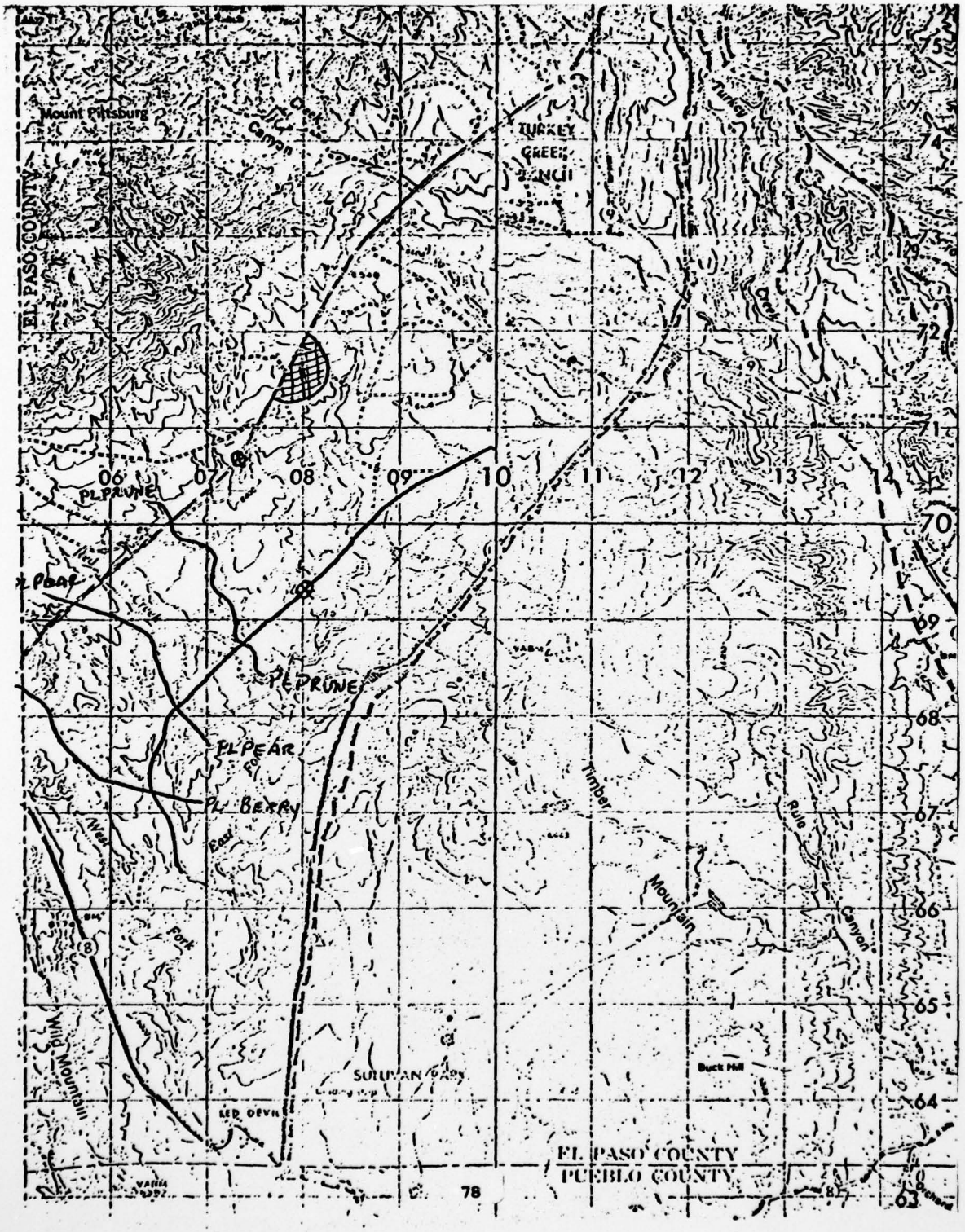
a. Signal

(1) Current CEOI in effect.

(2) Yellow and Violet smoke for signalling authorized.

b. Command: Bn Command CP initially in vic 094728.

B. E. MIDDLETON
Commanding



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OPORD 30 Offense N/S lane, Exercise 7

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 AR

TM Armor	TM Mech
C/4-40 AR (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 AR	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-) (GS)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation:

a. Enemy Forces: Enemy Mech/Armor units have been observed in the vicinity of 056682.

b. Friendly Forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) A 1/45 Arty

c. Attachment and Detachments: Scts to 1st Bde TF Con

2. Mission: Task force 4/40 will attack H-Hour, D-Day to seize and secure the high ground in the vicinity of 056682. 0/0 continue the attack south.

3. Execution:

a Concept of operation:

(1) Maneuver: Task force 4/40 Armor presently located at 098728 will conduct offensive operations H-Hour D-Day to secure the high ground in the vicinity of 056682. Presently friendly forces are occupying the LD.

Team elements will maneuver in zone to seize and secure objective APPLE. Once the objective is secured Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Armor. Fire support ASR is TBD and 3 Smoke missions.

b. Team Armor attack in zone and secure objective from 12 to 4 o'clock.

c. Company B attacks in zone following Team Armor and secures objective from 8 to 12 o'clock.

d. Team Mech attacks in zone following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task force control 0/0 be prepared to screen to the front of the objective and secured.

i. AVLB (GS) Task Force control.

j. Reserves: None

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be repoted to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Current CEOI in effect, Yellow and Violet smoke available for signalling.

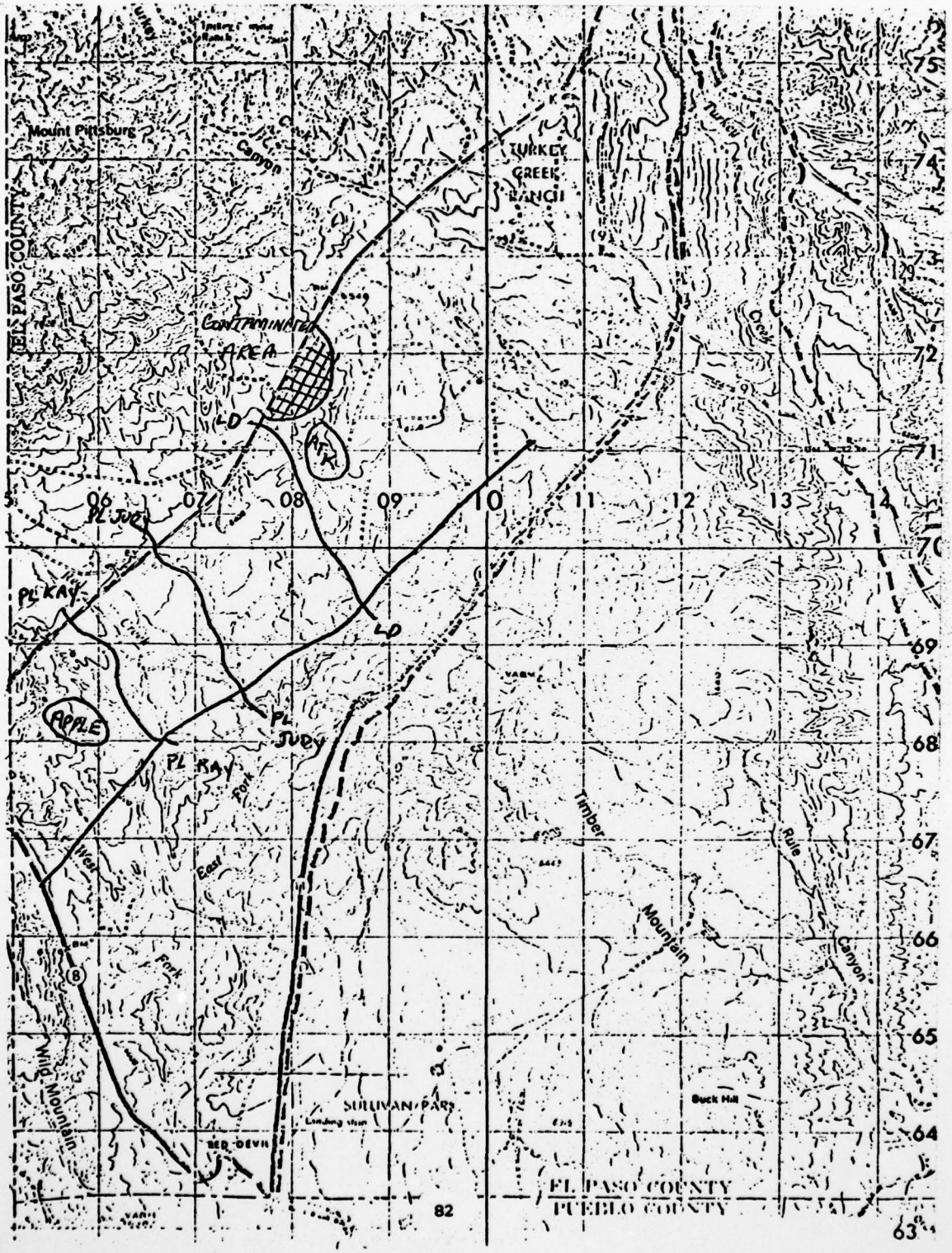
b. Command:

(1) Bn CP will be initially located at 085716 and will follow Tm Armor.

(2) Command will follow Team Mech in the attack.

Acknowledge

L. JACKSON
Commanding



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OPORD 10 Offense S/N lane, Exercise 7

Reference: Map Ft Carson and Vic 1:50,000 2nd DMATC edition

Time Zone: Local

Task Organization: TF 4/40 Ar

TM Armor	TM Mech
C/4-40 AR (-)	CSC/1-8 Inf (-)
1/A/1-8 Inf	1/C/4-40 AR
TOW Sec B/1-8 Inf	FIST (-) CSC/1-8 Inf
FIST (-) C/1-8 Inf	TOW Sec CSC/1-8 Inf
CO B	**TF CON**
B/4-40 Ar	A/1-45 Arty DS/O/OGS (155 Sp)
FIST (-)	AVLB (GS)
	Hvy Mtr (GS)
	REDEYE (-) (GS)
	FIST (-)
	Scts (-) (GS)
	Grd Srv Rdr (GS)

1. Situation

a. Enemy forces: Enemy armored forces have been delaying in sector and establishing defensive positions in the vicinity of Agony Ridge for the past four days.

b. Friendly forces:

(1) 1st Bde

(2) TF 1/8 Inf

(3) TF 2/34 Arm

(4) 1/45 Arty

c. Attachment & Detachments: Task Org.

2. Mission: TF 4/40 Armor attack H-Hour D-Day to secure high ground vicinity 092715. O/O continue the attack north.

3. Execution:

a. Concept of operation:

(1) Maneuver: Task force 4/40 Armor will conduct offensive

operations to secure the high ground in the vicinity of 092715. Once the objective is secured, Task Force 4/40 will consolidate on the ground and be prepared to continue offensive operation 0/0.

(2) Fire Support: Priority of fires to Team Mech fire support ASR is T.B.A. and 3 Smoke missions.

b. Team Mech attack in zone and secure objective from 12 to 4 o'clock.

c. Company B attacks in zone following Team Mech and secures objective from 8 to 12 o'clock.

d. Team Armor attacks in zone following Company B, once on the objective secure from 4 to 8 o'clock.

e. Scout Plt (GS) - Screen TF flank east of Hwy 11 and report and maintain any enemy contact.

f. Hvy Mortar Plt (GS) - Task Force control consolidate with Battalion TOC.

g. REDEYE GS to task force control priorities to TOC, Trains, and MSR, in that order.

h. GRD SVR RDR (GS) - Task Force control 0/0 be prepared to screen to the front of the objective once secured.

i. AVLB (GS) Task Force control.

j. Reserves: None.

k. Coordinating Instructions: Report all crossings of Phase Lines and enemy contact.

4. Service Support:

a. Resupply of all classes will be conducted daily at 0600 hours.

b. Casualties will be reported to TF TOC and evacuated by Battalion Medical Platoon.

c. POW Evac per unit SOP.

5. Command and Signal:

a. Signal: Curren CEOI in effect, Yellow and Violet smoke available for signalling.

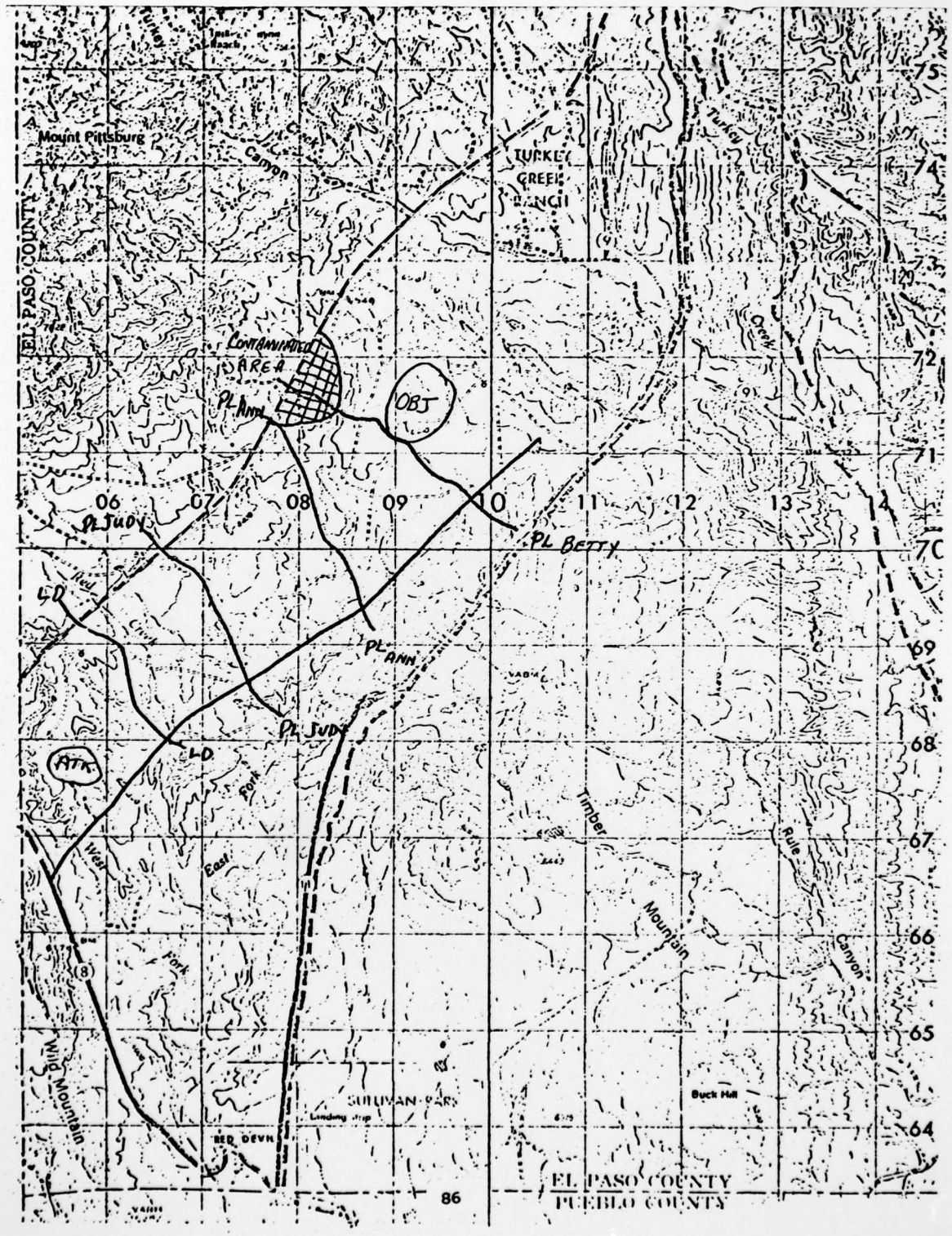
b. Command:

(1) Bn TOC will be initially located at 070662 and will follow Tm Mech.

(2) Command will follow Team Armor in the attack.

Acknowledge

L. JACKSON
Commanding



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APPENDIX C. DESCRIPTION OF FORCE MIXES

During the field exercises, each force was a company (-) team composed of a team headquarters, tank platoon, two rifle squads, TOW section, and fire support team (FIST). The FIST contains a forward observer, assistant forward observer, and driver. Headquarters sections were composed of the company team commander (CTC) and crew members of his vehicles. On one team, the CTC was an armor captain who used his tank and crew. On the other team, the CTC was an infantry captain who used his jeep, driver, and radio telephone operator. These force mixes were used for exercises 1, 2, 3, 4, 5, and 7. In exercises 6 and 8, both tank platoons were given to the attacking team. During the forecasting exercises, two minor changes were made in the force mixes - no FIST teams were used and the infantry CTC was in an APC instead of a jeep.

APPENDIX D. ORDER OF THE EXERCISES

In the field exercises, six of the eight exercises were attack/defend missions. For exercises 1, 2, 3, and 4, each team had a tank platoon, while for exercises 6 and 8, both tank platoons were assigned to the attacking team. Exercises 5 and 7 were meeting engagements. Mission assignments were counterbalanced so each force had to attack an equal number of times, and the direction of attack was also counterbalanced, in case one direction of attack was more difficult than the other.

Exercise No.	Tm A	Tm B	Force Mix
1	attack N to S	defend in S	each team has tank platoon
2	defend in N	attack S to N	each team has tank platoon
3	defend in S	attack N to S	each team has tank platoon
4	attack S to N	defend in N	each team has tank platoon
5	attack N to S	attack S to N	each team has tank platoon
6	defend in S	attack N to S	B has both tank platoons
7	attack S to N	attack N to S	each team has tank platoon
8	attack S to N	defend in N	A has both tank platoons

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APPENDIX E. CASUALTIES AND WEAPON SYSTEM EFFECTS

Table E-1

Weapon System Effect for CATEST 1

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Team:	A	A	A	A	A	A	A	A	A	B	B	B	A	A	B
Target:	FO	TK	PC	TK	PC	TK	TW	TW	TK	TK	I	TK	TK	TK	TK
Firer:	ART	TK	TW	ART	TK	ART	ART	ART	LAW	LAW	I	90mm	90mm	90mm	TK

	Targets						
Weapon	TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	2	2		1		5	33
TOW			1			1	7
Tanks		2	1			3	20
APC							
LAW		2				2	13
90mm		3				3	20
M60							
Infantry					1	1	7
Grenade							
Other							
Total	2	9	2	1	1	15	
Percent	13	61	13	6	6		

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Table E-2

Weapon System Effect for CATEST 2

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	B	A	A	B	A	B	A	A	B	A	B	B	A	B	B
Target:	TK	I	TK	TK	I	TK	TK	I	I	I	TK	I	I	I	I	TK
Firer:	TW	I	ART	ART	I	TW	ART	I	I	I	TW	ART	ART	GR	I	90mm

Event No:	17	18	19	20	21	22
Team:	A	B	B	B	B	B
Target:	I	I	I	I	FO	TK
Firer:	I	90mm	I	GR	ART	TK

Event No:	23	24	25	26	27
Team:	A	A	B	B	B
Target:	TW	I	TK	I	PC
Firer:	90mm	I	90mm	90mm	90mm

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery		3		1	2	6	22
TOW		3				3	11
Tanks		1				1	3
APC							
LAW							
90mm	1	2	1		2	6	22
M60							
Infantry					9	9	33
Grenade					2	2	7
Other							
Total	1	9	1	1	15	27	
Percent	3	33	3	3	55		

Table E-3

Weapon System Effect for CATEST 3

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	B	B	A	B	A	A	B	A	B	A	B	A	B	A	B
Target:	TK	TK	TK	2I	5I	TK	TK	I	I	PC	TK	TW	TK	I	I	5I
Firer:	TW	TW	TW	M60	M60	LAW	LAW	ART	M60	M60	TW	TW	M60	GR	M60	TK

Event No:	17	18	19	20	21	22
Team:	A	B	A	A	A	B
Target:	TK	I	TK	TK	90mm	½TK
Firer:	90mm	M60	90mm	90mm	I	TW

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery					1	1	3
TOW	1	4		1		6	20
Tanks					5	5	17
APC							
LAW		2				2	7
90mm		4				4	13
M60		1	1		9	11	37
Infantry							
Grenade					1	1	3
Other							
Total	1	11	1	1	16	30	
Percent	3	37	3	3	54		

Table E-4

Weapon System Effect for CATEST 4

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	B	B	B	A	A	A	A	A	A	A	B	A	A	B	A
Target:	TK	½TK	TK	I	TW	2I	TK	TK	TK	2I	2I	2I	I	TK	TK	TK
Firer:	ART	ART	ART	ART	ART	ART	ART	TK	ART	ART	M60	I	I	TW	TW	90mm

Event No:	17	18	19
Team:	A	A	B
Target:	TK	I	I
Firer:	90mm	I	I

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	1	4		1	5	11	48
TOW		2				2	9
Tanks		1				1	4
APC							
LAW							
90mm		2				2	9
M60					2	2	9
Infantry					5	5	22
Grenade							
Other							
Total	1	9		1	12	53	
Percent	4	39		4	52		

Table E-5

Weapon System Effect for CATEST 5

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	B	B	A	B	A	A	B	A	A	B	A	A	B	B	B
Target:	PC	TW	PC	TW	TK	PC	FO	TK	I	TK	I	TK	I	PC	I	PC
Firer:	TW	TW	TW	TW	90mm	TK	TW	LAW	I	I	TK	LAW	ART	TK	I	I

Event No:	17	18	19	20	21	22
Team:	B	B	B	A	A	B
Target:	2I	TK	2I	TK	TK	TK
Firer:	I	TK	I	TK	TK	LAW

Event No:	23	24	25	26	27	28	29
Team:	B	B	B	A	B	A	B
Target:	TK	TW	I	I	I	TK	90mm
Firer:	TK	TK	TK	I	TK	90mm	TK

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery					1	1	3
TOW	2		2	1		5	16
Tanks	1	5	1		4	11	35
APC							
LAW		3				3	10
90mm		2				2	6
M60							
Infantry		1	1		7	9	29
Grenade							
Other							
Total	3	11	4	1	12	31	
Percent	10	35	13	3	39		

Table E-6

Weapon System Effect for CATEST 6

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	B	B	A	B	A	B	B	B	B	B	B	B	B	B	B
Target:	PC	TW	TK	I	I	I	4I	I	I	TK	TK	I	TK	TK	TK	TK
Firer:	ART	TW	ART	I	[illegible]	I	LAW	I	GR	TW	TK	I	TW	TW	TW	TW

Event No:	17	18	19	20	21	22
Team:	A	A	B	B	B	B
Target:	I	TW	TK	TK	TK	TK
Firer:	GR	90mm	ART	90mm	TW	ART

Event No:	23	24
Team:	B	B
Target:	I	I
Firer:	ART	I

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery		3	1		1	5	19
TOW	1	7				8	30
Tanks							
APC							
LAW					4	4	15
90mm	1	1				2	7
M60							
Infantry					6	6	22
Grenade					2	2	7
Other							
Total	2	11	1		13	27	
Percent	7	41	4		48		

Table E-7

Weapon System Effect for CATEST 7

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	B	A	A	A	B	B	A	B	A	A	A	A	B	A	B
Target:	PC	PC	TK	TK	TK	I	TK	TW	2I	2I	I	2I	I	TK	I	2I
Firer:	TK	TK	TW	90mm	90mm	TW	TW	GR	I	I	GR	I	GR	TW	GR	I

Event No:	17	18	19	20	21	22
Team:	B	B	B	B	B	B
Target:	TW	TW	PC	I	TK	½TK
Firer:	LAW	LAW	ART	ART	ART	ART

Event No:	23	24	25	26	27	28
Team:	B	A	B	A	A	A
Target:	PC	PC	I	TK	TK	I
Firer:	ART	ART	TK	ART	ART	ART

Event No:	29	30	31	32	33	34
Team:	A	B	A	A	B	A
Target:	TK	TW	TK	TW	TK	2I
Firer:	ART	TK	I	ART	TK	I

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	1	4	2	1	2	10	26
TOW		3			1	4	11
Tanks	1	1	2		1	5	13
APC							
LAW	2					2	5
90mm	2					2	5
M60							
Infantry		1			10	11	29
Grenade	1				3	4	11
Other							
Total	7	9	4	1	17	38	
Percent	18	24	11	3	45		

Table E-8

Weapon System Effect for CATEST 8

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	A	A	A	A	B	A	A	B	A	A	B	B	B	B	A
Target:	TK	TK	PC	TK	TK	TK	TK	TK	TW	TK	TK	I	I	I	2I	2I
Firer:	TW	90mm	GR	ART	ART	ART	ART	ART	TW	LAW	LAW	GR	I	TW	I	I

Event No:	17	18	19	20	21	22
Team:	B	A	B	A	B	B
Target:	I	I	6I	TK	I	I
Firer:	I	I	ART	90mm	TK	TK

Event No:	23	24	25
Team:	A	B	B
Target:	TK	PC	I
Firer:	TK	TK	TK

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery		5			6	11	34
TOW	1	1			1		9
Tanks		1	1		3	5	16
APC							
LAW		2				2	6
90mm		2				2	6
M60							
Infantry					7	7	22
Grenade			1		1	2	6
Other							
Total	1	11	2		18	32	
Percent	3	34	6		56		

Table E-9

Weapon System Effect for Forecasting Exercise 1

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	B	A	B	A	A	B	B	A	B	A	B	B	B	B	B
Target:	TK	TK	PC	TW	TK	TK	5I	4I	TK	TW	TK	PC	PC	TK	2I	TK
Firer:	TK	TK	90mm	ART	TW	90mm	TK	TK	TW	ART	ART	LAW	ART	ART	PC	LAW

Event No:	17	18	19	20	21	22
Team:	B	A	A	B	A	B
Target:	TK	PC	I	TK	I	3I
Firer:	LAW	TK	TK	ART	I	TK

Event No:	23	24	25	26	27	28
Team:	A	B	A	B	A	A
Target:	TK	6I	I	TK	8I	TK
Firer:	90mm	TK	I	90mm	TK	TK

Event No:	29
Team:	B
Target:	TK
Firer:	LAW

Weapon	Targets: TOW	TK	APC	¾ Ton truck	INF.	Total	Percent
Artillery	2	3	1			6	12
TOW		2				2	4
Tanks		3	1		27	31	60
APC					2	2	4
LAW		3	1			4	8
90mm		3	1			4	8
M60							
Infantry					2	2	4
Grenade							
Other							
Total	2	14	4		31	51	
Percent	4	27	8		60		

Table E-10

Weapon System Effect for Forecasting Exercise 1a

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	A	B	A	A	A	B	B	B	B	A	A	B	A	B	A
Target:	PC	PC	TW	TK	TK	TW	TW	PC	TK	TK	TK	TW	TK	TK	TK	TK
Firer:	TK	TW	TW	ART	ART	ART	TK	TK	TW	ART	TK	TK	ART	TK	TK	TK

Event No:	17	18	19	20	21
Team:	B	A	A	B	A
Target:	TK	TK	PC	TK	5I
Firer:	TK	TK	TK	90mm	TK

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	1	4				5	20
TOW	1	1	1			3	12
Tanks	2	6	3		5	16	64
APC							
LAW							
90mm		1				1	4
M60							
Infantry							
Grenade							
Other							
Total	4	12	4		5	25	
Percent	16	48	16		20		

Table E-11

Weapon System Effect for Forecasting Exercise 2

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	A	B	A	B	A	B	A	A	A	B	A	B	B	A	A
Target:	PC	TK	TK	I	TK	TK	TK	TK	PC	TK	TK	5I	PC	TW	5I	TK
Firer:	ART	ART	ART	TK	TK	TK	TK	TW	ART	ART	ART	I	LAW	ART	I	LAW

Event No:	17	18	19	20	21	22
Team:	A	A	B	A	A	B
Target:	4I	TK	TK	TW	PC	TK
Firer:	I	TK	TK	TK	90mm	TK

Event No:	23	24	25	26
Team:	A	B	B	A
Target:	TW	TW	4I	4I
Firer:	TW	LAW	ART	I

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	1	4	2		5	12	31
TOW		1				1	3
Tanks	1	4			1	6	15
APC							
LAW		1	1			2	5
90mm			1			1	3
M60							
Infantry					17	17	44
Grenade							
Other							
Total	2	10	4		23	39	
Percent	5	26	10		59		

Table E-12

Weapon System Effect for Forecasting Exercise 2a

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	B	A	A	B	B	A	B	A	A	B	A	B	A	B	A	B
Target:	TK	TK	TK	PC	PC	5I	8I	PC	4I	2I	3I	2I	2I	TK	PC	PC
Firer:	ART	90mm	90mm	ART	ART	I	I	90mm	I	I	I	I	I	90mm	90mm	TK

Event No:	17	18	19	20	21	22
Team:	A	B	B	A	B	A
Target:	TW	TW	TK	I	TK	TW
Firer:	TK	TK	LAW	TK	TW	TW

Weapon	Targets: TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery		1	2			3	7
TOW	1	1				2	5
Tanks	1	1	1		1	4	10
APC							
LAW		1				1	2
90mm		3	2			5	12
M60							
Infantry					26	26	63
Grenade							
Other							
Total	2	7	5		27	41	
Percent	5	17	12		66		

Table E-13

Weapon System Effect for Forecasting Exercise 3

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13
Team:	A	A	A	A	A	A	A	B	A	A	A	A	A
Target:	PC	PC	TW	TK	TK	TK	PC	TK	TW	5I	TK	TK	TK
Firer:	TW	TW	ART	TW	TW	TW	TK	TW	TW	I	TK	90mm	LAW

Weapon	Targets					Total	Percent
	TOW	TK	APC	¼ Ton truck	INF.		
Artillery		1				1	6
TOW	1	4	2			7	41
Tanks		1	1			2	12
APC							
LAW		1				1	6
90mm		1				1	6
M60							
Infantry					5	5	29
Grenade							
Other							
Total	1	8	3		5	17	
Percent	6	47	18		29		

Table E-14

Weapon System Effect for Forecasting Exercise 4

Event No:	1	2	3	4	5	6	7	8	9
Team:	B	B	B	B	B	B	B	B	B
Target:	TK	TK	TK	TK	TK	TK	TK	PC	PC
Firer:	ART	90mm	LAW	90mm	90mm	TW	TK	TK	TK

	Targets							
Weapon	TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery		1				1	11
TOW		1				1	11
Tanks		1	2			3	33
APC							
LAW		1				1	11
90mm		3				3	33
M60							
Infantry							
Grenade							
Other							
Total		7	2			9	
Percent		78	22				

Table E-15

Weapon System Effect for Forecasting Exercise 5

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Team:	B	A	B	B	B	B	B	A	A	A	A	B	A	A	B
Target:	PC	TW	TW	PC	TK	TK	TK	TK	9I	PC	TK	TK	TK	TW	TK
Firer:	TW	TW	TW	TW	TW	ART	90mm	90mm	TK	TK	TK	TK	TK	ART	LAW

	Targets						
Weapon	TOW	TK	APC	¼ Ton truck	INF.	Total	Percent
Artillery	1	1				2	13
TOW	2	1	2			5	33
Tanks		3	1		1	5	33
APC							
LAW		1				1	7
90mm		2				2	13
M60							
Infantry							
Grenade							
Other							
Total	3	8	3		1	15	
Percent	20	53	20		7		

Table E-16

Weapon System Effect for Forecasting Exercise 5a

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	A	B	B	B	B	A	B	A	B	A	B	A	A	B	A
Target:	TK	TK	TK	PC	TK	PC	4I	PC	TW	TK	9I	TK	PC	PC	3I	3I
Firer:	TW	TW	TK	ART	TW	TW	I	LAW	ART	90mm	TK	TK	LAW	LAW	I	I

Event No:	17	18	19	20	21	22
Team:	B	A	B	A	B	A
Target:	2I	PC	2I	2I	2I	I
Firer:	I	LAW	I	I	I	I

Event No:	23	24
Team:	B	B
Target:	I	TW
Firer:	I	TW

	Targets						
Weapon	TOW	TK	APC	¾ Ton truck	INF.	Total	Percent
Artillery	1		1			2	5
TOW	1	3	1			5	12
Tanks		2			9	11	26
APC							
LAW			4			4	9
90mm		1				1	2
M60							
Infantry					20	20	47
Grenade							
Other							
Total	2	6	6		29	43	
Percent	5	14	14		67		

Table E-17

Weapon System Effect for Forecasting Exercise 6

Event No:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Team:	A	A	B	A	B	B	A	A	A	A	A	A	A	A	A	A
Target:	PC	I	I	4I	PC	I	TK	TW	TK	TK	TK	TK	TK	TK	TK	TK
Firer:	90mm	I	I	I	PC	TK	TW	ART	TW	TW	ART	ART	ART	TW	TW	TK

Event No:	17	18
Team:	B	A
Target:	TW	TK
Firer:	TK	TW

Weapon	Targets: TOW	TK	APC	¾ Ton truck	INF.	Total	Percent
Artillery	1	3				4	19
TOW		6				6	29
Tanks	1	1			1	3	14
APC			1			1	5
LAW							
90mm			1			1	5
M60							
Infantry					6	6	29
Grenade							
Other							
Total	2	10	2		7	21	
Percent	10	48	10		33		

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