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VOLUME II

LOGISTICS

U. S. ARMY
COMBAT DEVELOPMENTS EXPERIMENTATION CENTER
FORT ORD, CALIFORNIA

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US ARMY COMBAT DEVELOPMENT EXPERIMENTATION CENTER

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INTEGRATED COMBAT GROUP COMPONENTS EXPERIMENT, PHASE III

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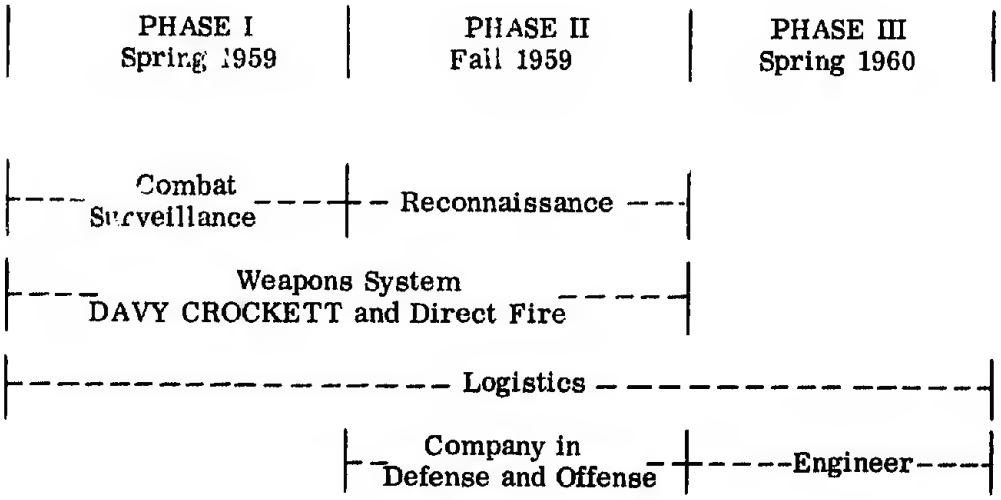
Preface

The development of a balanced integrated combat group, capable of sustained independent, semi-independent, or attached operation in the battle environment of the future, is one of the long-range goals of the Army's combat development system. Toward this goal, USA CDEC has completed a three-phase experiment for the purpose of examining various components of the PENTANA-type Integrated Combat Group (ICG) as follows:



This volume reports on Logistics experimentation which, as indicated above, constituted a portion of the ICG Phase III experiment. The Engineer portion of Phase III experimentation is reported separately as Volume I of "Integrated Combat Group Components Experiment, Phase III."

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I. General

A. INTRODUCTION

1. The Integrated Combat Group Phase III Logistical Experimentation was conducted at the Hunter Liggett and Camp Roberts Military Reservations from 25 April to 9 June 1960.

2. Guidance for the conduct of experimentation was provided by two documents: (1) Outline Plan of Experimentation, Integrated Combat Group Components, Phase III Experimentation, 3d and 4th Quarters, FY 60, CDEC, 15 December 1959 and (2) Letter: ATSWD-R 322/1, (CDEC)(CONFMOD)(16 FEB 59), Hq, USCONARC, 16 February 1959, Subject: "Directive for CDEC Experimentation Program (U)."

3. The detailed conduct of Phase III Logistical Experiment is described in Annex A.

4. The specific logistical organizations examined are shown in Appendix 1 of Annex A.

5. a. Phase III Logistical Experimentation examined a system of unit delivery from higher to lower levels at all of the echelons being examined. Examination of the logistical support systems was limited by the directive to the functional activities of resupply, repair and maintenance, evacuation, and movements control.

b. With the exception of the Medical experiment, all logistical experimentation was conducted within the framework of the Evaluation of Tactical Units, Phase I, Experiment. (For details of that experiment, see "Evaluation of Tactical Units, Phase I" (CDOG, CDEC 60T8)(C) USA CDEC, May 1961.) The PENTANA-type service company proposed by the PENTA GROUP War Games Evaluation was used to provide logistical support to the tactical units undergoing concurrent experimentation. Logistical play was integrated into the tactical experiments to insure that the requirements were within logistical support capability. At the echelons above the Integrated Combat Group representative slices of logistical units were used. Field facilities were established by the representative slices concerned.

c. The Medical experiment was conducted according to a preplanned schedule of casualty assessment and other than making use of tactical unit personnel as casualties when they were not engaged in the tactical experiment, was entirely independent of the latter experiment.

d. Evaluation of the logistical concepts and organizations examined is based both on the observations and judgment of the senior

military officers who conducted and observed the experiment, and the evidence afforded by the numerical data.

7. The objectives of the experiment are set forth in following paragraph B of this section, and the conclusions and recommendations are summarized in paragraphs C and D, respectively. Sections II, III, and IV contain detailed discussions, as well as the specific conclusions and recommendations, as these apply to the supply, maintenance, and medical experiments, respectively. The numerical data for each of these experiments are summarized in Annexes B, C, and D, respectively.

B. OBJECTIVES

1. General Objectives:

To examine the capabilities and limitations of the PENTANA-type Integrated Combat Group Service Company and service elements of the PENTANA Forward Intransit Depot in meeting the logistical support requirements of the Combat Group and its attachments in selected resupply, maintenance, and evacuation activities under the following conditions:

a. The subordinate elements of the Integrated Combat Group possess an austere organic capability and only that maintenance capability which can be performed by the user.

b. Resupply of Classes I, III, and V supplies will be on a scheduled basis variable by the user.

c. Distribution of supplies will be accomplished under the unit delivery concept with emphasis on support from rear to front.

d. Evacuation of casualties from the point of incidence to the Integrated Combat Group Medical Aid Station will be accomplished by the Integrated Combat Group Medical Platoon.

2. Specific Objectives:

a. Examine the performance of the service elements of the Integrated Combat Group in meeting logistical requirements generated by the play of the experiment in the functional areas of:

(1) Supply, resupply, and replenishment.

(2) Materiel maintenance, repair, and evacuation.

(3) Triage and evacuation of personnel casualties.

b. Examine the performance of the logistical elements of the

Field Army Composite Support Group operating from the FIDO complex in meeting the logistical requirements generated by the play of the experiment in the functional areas of:

(1) Supply, resupply, and replenishment.

(2) Transportation and Movement Control.

(3) Materiel maintenance and repair.

(4) Triage, treatment, and evacuation of personnel casualties.

C. SUMMARY OF CONCLUSIONS

The following is a brief summary of the major conclusions reached concerning each of the logistical support areas examined. For discussion of the results of the experiment, as well as the detailed conclusions drawn therefrom, the reader is referred to appropriate sections as noted.

1. Supply (Section II)

The Composite Support Group Supply Company and Movements Company, and the Supply Platoon of the Integrated Combat Group Service Company, were well able to meet the demands imposed by the play of the experiment, although because of the limited scope of the experiment no definite conclusion can be drawn as to the capabilities of these units to support a full PENTANA division. The concepts and procedures used are considered practicable and generally effective.

2. Maintenance (Section III)

The maintenance elements of the Integrated Combat Group and the Composite Support Group are capable of providing much more maintenance support than was required during the experiment, and indications are that these elements should have no difficulty in meeting the requirements of a full ICG division of five companies. The concepts and procedures followed were demonstrably effective.

3. Medical (Section IV)

The examined concept of forward medical service is considered valid, and the performance of the Integrated Combat Group Medical Platoon demonstrated its successful application under the conditions of the experiment. The essentials of this effective system were seen as a three-man aid-evacuation team mounted in an armored ambulance, with control from a company collecting post over a medical command net, and a team capability to monitor the company command net as well. The proportion of evacuations completed successfully was determined to be

directly related to the availability of ambulances, and an improvement in performance can be obtained by improving such techniques and procedures as effect the availability of amoulances.

D. SUMMARY OF RECOMMENDATIONS

The major recommendations within each area of logistical experimentation are summarized below. Discussions of the points involved, and detailed recommendations, will be found in the individual sections as noted.

1. Supply (Section II)

It is recommended that the concepts of scheduled resupply and unitized cargo be incorporated in the over-all concept of PENTANA logistical support, and that a Logistical Control Center Movements Officer be included in the TOE of the Composite Support Group.

2. Maintenance (Section III)

It is recommended that company maintenance sections be retained in mechanized units, and that maintenance functions at the lower support level be broadened in scope.

3. Medical (Section IV)

The recommendations include a three-man aid-evacuation team as the basic element of forward medical service in armored units, further experimentation to determine the workload capacities of the company collecting post and the aid-evacuation team, increased emphasis on medical enlisted personnel, and the use of air vehicles for evacuation to the rear of the Integrated Combat Group area.

II. Supply

A. GENERAL

1. Concept

As was stated in the previous section, ICG Phase III experimentation examined a system of logistical support which functioned under the concept of support from higher to lower levels at all of the echelons being examined. Accordingly, supply, resupply, and replenishment during the experiment were accomplished with the emphasis of support from rear to front as described in paragraph 3 below. The subordinate units of the ICG possessed an austere organic capability for the handling and transporting of supplies.

2. Experimental Approach

a. Performance of the supply units was measured in terms of the actual workload generated by the play of the tactical experiment together with support of the Engineer Company and Range Company that participated in the Engineer portion of ICG Phase III experimentation. (See Annex A for the detailed conduct of the logistical experimentation.) The data collected comprised a detailed reporting of the personnel and equipment utilized by the supply elements, the amounts of supplies requested and handled, and the times and distances involved. These data are summarized in Annex B.

b. The evaluation of the supply units is based upon military observations as well as such evidence as is afforded by the numerical data (see Discussion, para E of this section). The conclusions drawn and recommendations (paras C and D) represent the consensus of the military officers who conducted and observed the experiment.

3. Supply System Examined

Figures 1 and 2, following, depicts the channels of supply provided to the tactical units. Details of the mission and procedures followed for each of the supply units are presented below. (Organizational charts for all logistical units are included in Annex A.)

a. Supply Units:

The Supply Company and Movements Company of the Combat Support Group (CSG) represented the highest echelon of supply examined during the experiment. The mission of the CSG Supply Company is to maintain up-to-date supply schedules, process requested changes, request supplies in accordance with the schedule and perform all

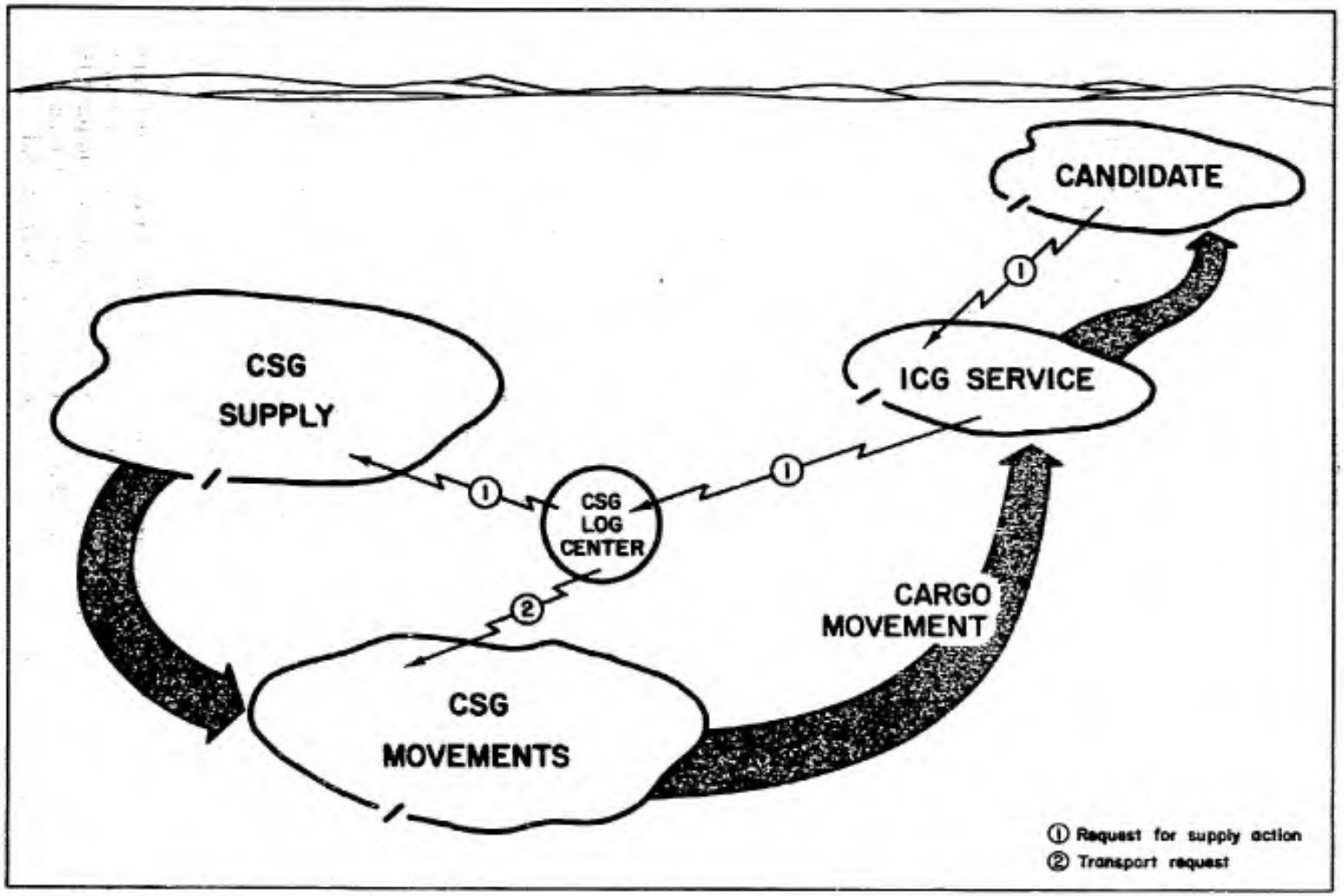


FIGURE 1 REGULAR SUPPLY/RESUPPLY CHANNELS

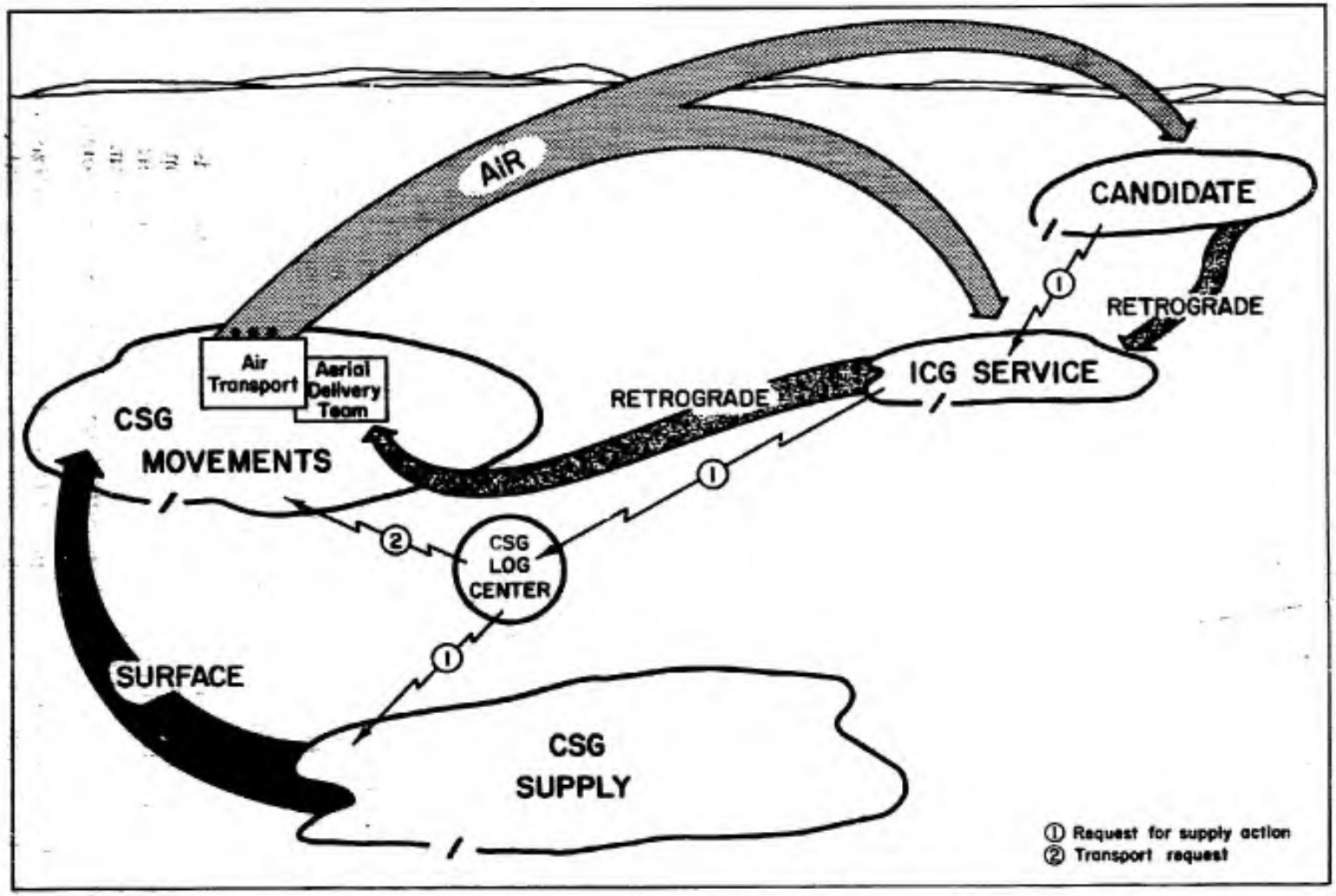


FIGURE 2 EMERGENCY SUPPLY/RESUPPLY CHANNELS

administrative and clerical activities related to the supply organization. The company receives, segregates, unitizes, palletizes, and turns over unit loads to FIDO transportation for movement to the ICG. It prepares emergency supplies, rigs supplies for aerial delivery and loads supplies on the air or ground vehicles provided. The mission of the CSG Movements Company is to provide air and ground transport, including the control thereof from the FIDO complex to the ICG Service Company Area.

The ICG Supply Platoon provided direct support for the experimental tactical units representing the combat group. The mission of the Supply Platoon is to perform supply, water purification, and transportation functions for the combat group.

b. Unit Delivery:

The unit delivery concept examined was based on supply , distribution and delivery by higher echelon to lower echelon to the user (see Figure 1). The Movements Company of the Composite Supply Group made all deliveries to the Integrated Combat Group. The Supply Platoon of the ICG Service Company delivered to the tactical units. The unit commanders completed the distribution to the user. In the case of gasoline, the supply platoon delivered to the individual vehicle.

c. Scheduled Resupply:

Under this procedure the tactical commander received an automatic daily issue of a predetermined fixed quantity of Class I, III, and V supplies. The schedules were prepared by the logistics officer of the Logistics Control Center and forwarded to the using company through the Integrated Combat Group S-4. The company commander's only responsibility for his supply needs was to inform the S-4 by 0630 hours on the day of issue of any changes desired in quantities or types of supplies scheduled for delivery. These changes were then forwarded, without consolidation, by the S-4 to the Logistic Control Center of the CSG for supply action. No units below FIDO level were authorized to maintain reserve stocks; consequently issues had to be made daily. Classes II and IV were issued on request and not included on resupply schedules.

d. Unitized Loads:

The FIDO Supply Company prepared unitized loads daily for each company based upon the quantities stipulated in the resupply schedules as adjusted by plus or minus variables submitted by the tactical unit commander. The FIDO Movements Company transported the unitized loads by air or land to the Integrated Combat Group Service Company.

The Service Company Supply Platoon transferred the unitized loads from the Movements Company's vehicles to Supply Platoon vehicles.

(During the first part of the experiment no fork lifts were available; consequently, unitized loads could not be transferred in-toto). The Supply Platoon moved the supplies to the tactical unit. Here the unitized loads were broken down and distributed by tactical personnel within the tactical unit.

Shipments of gasoline were accomplished in the same sequence but separate from unitized loads. In the absence of sealed-bin containers, tank trucks were used from FIDO to Service Company. The gasoline was then pumped into rolling liquid transporters and 1200-gallon tank trucks for delivery to the user.

Simulated Class I supplies were delivered using containers of the same cube and weight as "C" rations. This applied also to Class V supplies. Quantities issued were based upon the strengths of the supported units and expenditures ot Class V simulators during the conduct of the exercise.

e. Aerial Delivery:

Two methods of aerial delivery were utilized: air-land and air-drop. Approximately 20% of scheduled resupply was air-landed. Emergency supplies were also air-landed (Figure 3). Delivery by the air-drop method was conducted as a side experiment to obtain basic data on loading and rigging times and unloading times over the drop zone.

f. Transportation:

The SupplyPlatoon of the ICG Service Company furnished all transportation requirements for the Combat Group. Other than normal dispatching no controls or other movement functions were imposed.

The Movements Company of the Composite Support Group supplies all transportation, both air and ground for the FIDO. The company operated under and was coordinated by the Logistics Control Center (LCC) Movements Officer. The LCC Movements Officer established a forward movements control point at the ICG Service Company area from which the return movements of vehicles were controlled, and guidance to FIDO aircraft operating in the ICG area was furnished.

Air-drops were examined as a separate function and were governed by scenario rather than the play of the tactical situation. Messages were sent to the ICG, S4, by the project team, which designated emergency shipments to surrounded units. The ICG, S4, then notified the LCC Supply Officer of the air-drop mission. The Supply Officer advised the CO of the FIDO Supply Company. The cargo was packaged and delivered to the QM Aerial Delivery Team where it was prepared for air-drop. The LCC Supply Officer advised the Movements Officer of the time that the

cargo would be ready for loading, as well as the desired time of arrival, location of the drop zone, and other pertinent details. The ICG, S4, notified the tactical unit of the actual time of arrival of the aircraft over the drop zone. This information was furnished the ICG, S4, by the Forward Movement Control Point.

Communication was established between the Forward Movement Control Point and the aircraft, thereby maintaining maximum coordination between the receiving unit and delivering transport.

Cargo, parachutes and rigging were recovered by the tactical unit. Parachutes and rigging were turned over to the ICG Service Company where it was classified as retrograde cargo and returned to the FIDO Supply Company on the next available transportation.

B. OBJECTIVES

1. To examine the performance of the Composite Support Group Supply Company in meeting and processing the supply requirements generated by the play of the experiment.

2. To examine the performance of the Composite Support Group Movement Company in meeting the requirements generated by the play of the experiment in the functional areas of transportation and movement control.

3. To examine the performance of the Supply Platoon of the Integrated Combat Group in meeting logistical requirements generated by the play of the experiment in the functional areas of supply, resupply, and replenishment.

C. CONCLUSIONS

1. The CSG Supply Company and Movements Company, and the Supply Platoon of the ICG Service Company, were more than able to meet the demands imposed upon them by the play of the experiment. Because of the small number of units supported during the experiment, however, no definite conclusion can be drawn as to the ability of these supply units to support a full PENTANA division. (See Discussion, para 1a, p. 12.)

2. The establishment of a forward movement control point and direct supervision by the Logistical Control Center Movements Officer provided excellent control and coordination of supply operations. (See Discussion, para 3b, p. 15.)

3. The logistical concepts followed during the experiment are considered valid and were generally effective in facilitating supply operations, with the following qualifications:

a. The unit delivery system was feasible logistically and tactically, but under the conditions of the experiment did not offer economy of personnel or equipment. Cargo vehicles and their drivers were not fully utilized. (See Discussion, para 3a, p. 13 and para 4a, p. 15.)

b. Scheduled resupply proved effective, although it does not completely relieve the unit commander of responsibility for checking and reporting his resupply requirements. (See Discussion, para 4e, p. 16.)

c. Cargo handling equipment (i.e., the rough terrain forklifts authorized to the CSG Supply Company and the ICG Supply Platoon) is essential for handling unitized loads. (See Discussion, paras 2e and 2f, p. 13; para 4b, p. 15.)

4. The concept of using a Rolling Liquid Transporter for delivery of gasoline to front line units is considered sound; however, the need was seen for certain design modifications in the transporters used during the experiment. (See Discussion, para 4d, p. 16.)

D. RECOMMENDATIONS

It is recommended that:

1. Scheduled resupply and unitized cargo be incorporated within the logistical concepts of PENTANA support.

2. A Logistical Control Center Movements Officer be included in the TOE of the Composite Support Group.

3. The Rolling Liquid Transporter be modified to reduce the fire hazard during pumping operations, to provide a faster integral mechanism for dispensing, and otherwise make it more convenient to move from one vehicle to another in refueling operations.

E. DISCUSSION

1. Over-all Results

a. Military observers found that the CSG and ICG supply elements examined readily met the requirements as specified in the experimental objectives - i.e., the workloads imposed by the play of the experiment. In fact, the carrying capacities of these units substantially exceeded the demands indicated by the data. For example, Tables B-7 and B-8 show the numbers of dry-cargo vehicles required by the CSG and ICG supply units, respectively, to carry the experimental loads as transposed into actual cargo weights and cubes. These tables indicate an average daily requirement of only 3 vehicles of the CSG's available 9 tractor-trailers, and only 8 vehicles of the ICG's available 22 trucks. Furthermore, these averages are based on one trip per truck per day, which was far from a maximum utilization as indicated by the distances and trip times involved. (See Tables B-9 and B-10.) It should be noted, however, that the loads imposed under the conditions of the experiment were considerably less - perhaps by 50% - than those which might be anticipated for support of a full PENTANA-type Combat Group of five companies. The data showing total amounts of supplies requested and transported are summarized in Tables B-1 through B-6 of Annex B.

b. Insofar as the specified logistical concepts of unit delivery, scheduled resupply, and unitized loads, could be tested with the equipment available, these methods were considered by the military observers to be generally effective. The particular difficulties which arose during - and as a result of - the conduct of the experiment are discussed in the paragraphs which follow.

2. Performance of the CSG Supply Company

a. The vehicles of the Supply Company proved capable of fulfilling the organic transport requirements of the company. Table B-4 shows the total supplies, by item, introduced into the supply system by the CSG.

b. The initial supply schedules furnished the ICG tactical units proved adequate, and the scheduled resupply system operated effectively after tactical unit commanders recognized the necessity of reporting daily adjustments in the schedule.

c. Emergency supply requests were given priority, and the Supply Company had no difficulty in processing these concurrently with the routine shipments.

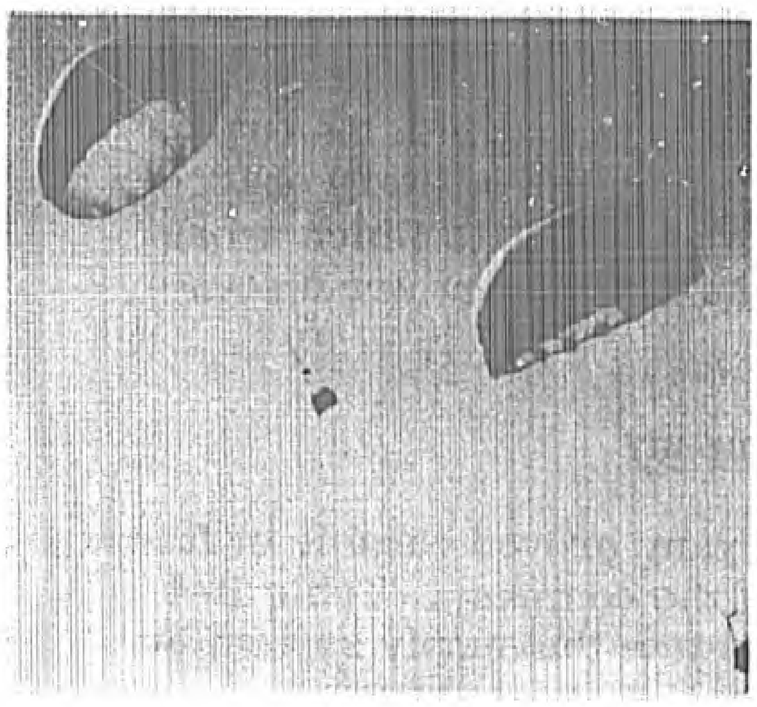
d. Within the limitations imposed by unavailability of authorized equipment (see following paragraph), the Supply Company's mission of receiving, segrating, unitizing, palletizing, and loading of vehicles and aircraft was readily accomplished.

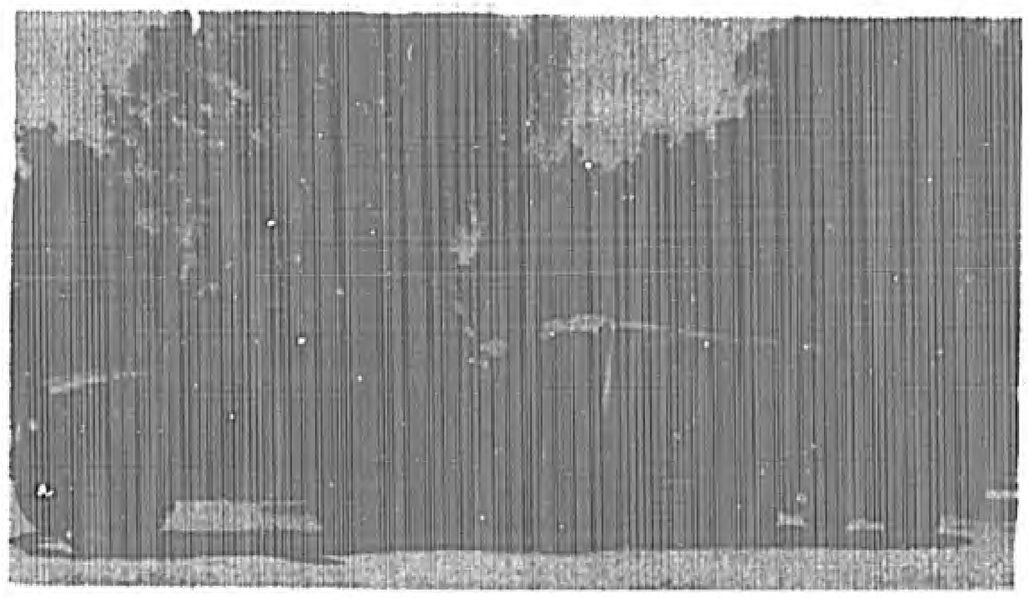
e. Forklifts are among the major items of equipment listed for the CSG Supply Company (see Tab 8, Appendix 1, Annex A), and during the final four weeks two standard pneumatic-tired 4000-lb forklifts were issued. Prior to their issuance, loads were not palletized for shipment, and were unitized only to the extent that segregation of cargo by unit was made in loading transport vehicles.

f. Given proper cargo handling equipment and compatible vehicles, unitized loading was considered by the observers as offering definite advantages. It facilitates the loading and unloading of cargo trucks and aircraft. Packaging of cargo stabilizes loads and prevents shifting, which would reduce damage in transit. However, a question may be raised (although not considered in the present experiment) as to the effect of unitized loads upon cargo space requirements.

3. Performance of the CSG Movements Company

a. This unit had a far greater capability than was required by the demands of the experiment, with respect to Class I, III, and V sup-





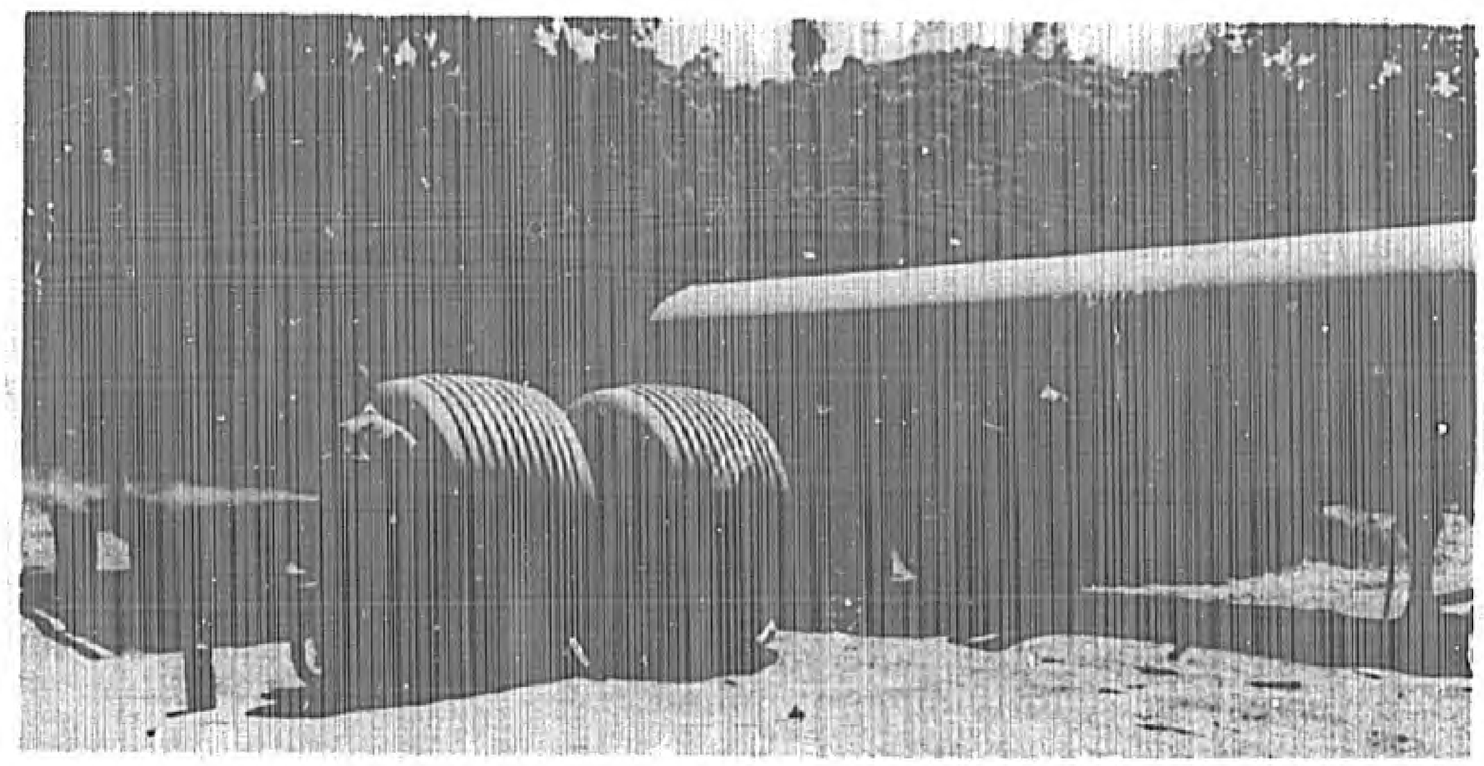


FIGURE 3 SUPPLY

Delivery was by both ground and air (top).

Rolling Liquid Transporter is being loaded with gasoline for direct delivery to using vehicles (center).

Unitized loads require use of forklift (bottom). Rough-terrain model, not shown, is authorized for ICG Supply Platoon.

plies. The company had an estimated ability to transport some 339 tons of dry cargo daily*, whereas the total tonnage of such cargo introduced into the supply system during the entire experiment was only 578 tons (Table B-7). The unit had a capacity for transport of some 90,000 gallons of gasoline daily*, but only 75,000 gallons were called for during the entire experimentation period (Table B-4). No examination was made of the company's ability to move troops and Class I and IV supplies, since the units supported were too few in number to warrant evaluation in this area.

b. Including a movements officer in the Logistical Control Center (LCC) centralized control of transportation and simplified coordination between staff agencies and operating units. Priorities were readily established, duplication of requests eliminated, and movements adequately regulated. The forward movements control point at the ICG Service Company Area not only assisted the LCC Movements Officer, but was a source of up-to-the-minute information of arrival times of inbound convoys and aircraft to the ICG S4.

4. Performance of the ICG Service Company Supply Platoon

a. The transport vehicles of the ICG Supply Platoon were adequate in type and number to lift the required supplies without difficulty (see Table B-8). In fact, it was noticeable that the cargo vehicles were often idle, and were fully utilized only once a day during the period when supplies were received from FIDO and moved to the user. As previously discussed (para 1), however, the units supported during the experiment represented only a portion of an ICG.

b. As organized (see Tab 6, Appendix 1, Annex A) the Supply Platoon is capable of handling unitized loads effectively, although it was unable to do so during the experiment until forklifts were issued. (Standard forklifts were issued, in substitution for the authorized rough-terrain forklifts, which were unavailable.) During the first portion of the experiment when no forklifts were used, the platoon was unable to load or off-load unitized loads. Furthermore, use of the substitute forklifts prevented the Supply Platoon from moving its service area, inasmuch as this type of forklift, unlike the rough-terrain type, cannot be moved over the road under its own power. There were further difficulties with pallets, since those available were not of the proper size for the trucks used. Given proper cargo handling and equipment and pallets compatible with vehicles, however, it was the opinion of the military observers that unitized loads decrease operation times and numbers of personnel required.

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* Estimate based on a 20-hour operating day, three round trips per day, over the main supply route between Hunter Liggett and Camp Roberts Military Reservations.

c. Delivery of water presented no problems. Water trailers were filled by Supply Platoon personnel and delivered to the supported units.

d. For delivery of gasoline to front line units, four 1000-gallon Rolling Liquid Transporters (RLTs) were used in conjunction with 1200-gallon tank trucks. Tank trucks presented no problems during the experiment, but there is little doubt that under combat conditions, over rough terrain, these trucks would be of little value. While the RLTs used during the experiment were not entirely satisfactory, the concept of a transporter that can be towed by any vehicle on the battlefield appeared to be sound. It is possible that minor changes in design might overcover the following problems encountered during the experiment:

1) Because of the time and work involved in disconnecting airlines and rolling up hoses, the RLTs could not be readily moved from vehicle to vehicle.

2) Since there was no indicator of the amount of fuel remaining in the bag, the operator could unwittingly pump the bag dry and fill his hose with explosive fumes. This of course presented a fire hazard, especially in the vicinity of hot engine manifolds.

3) The desired exchange of full for empty transporters could not be made, since the tactical units themselves were not equipped for pumping the transporters. The hand pump attached to the transporter is far too slow for tactical fueling; during the experiment it was necessary to use the air compressors on the Supply Platoon's 2 1/2 ton trucks.

e. Scheduled resupply (of Class I, III, and V items) was considered by the observers to be advantageous in providing an uninterrupted flow of supplies to the tactical companies. The system operated without any major difficulties, although it was found that considerable plus and minus adjustments in the schedule were required within the first several days of operation. Also, until tactical unit commanders became accustomed to the system, they sometimes neglected to determine the status of their supplies and relied solely upon automatic resupply, with the result that they became over-supplied on some scheduled items and short on others. This was not a major problem, however, as indicated by the few requests for emergency resupply shown in Table B-1. In fact, the latter figures may be interpreted as attesting to the value of automatic resupply.

f. No casualties were evacuated by ground supply vehicles, since the medical experiment which examined this area was not conducted

in conjunction with the other logistical experimentation. However, the periods observed when supply vehicles were idle (para a, above) suggest that under the unit delivery system, many such vehicles may be available for evacuation purposes during most of the day. This observation must be qualified, of course, by noting once again that the supply experimentation did not involve support of a full ICG.

III. Maintenance

A. GENERAL

1. Concept

The over-all logistical concept examined during ICG Phase III experimentation was that of support from higher to lower levels at all echelons. In line with this concept, the emphasis of maintenance support was from rear to front. The organic maintenance capability of the supported tactical unit was represented as austere, being limited to such maintenance as could be performed by the user. Essentially this consisted of routine servicing of equipment, although drivers and operators assisted mechanics and repairmen from higher support echelons in on-site repairs.

2. Experimental Approach

a. Performance of the maintenance elements was measured in terms of the actual workloads imposed by the play of the tactical experiment. It should be noted that the experimental tactical units were required to reconstitute to 100% of men and equipment prior to the start of each tactical exercise, which meant that reserve stocks of vehicles, radios, and other major items had to be maintained near tactical areas to prevent interruption of the tactical program. This represented an estimated 30% addition to the combat materiel supported.

b. The data required to fulfill the objectives of the maintenance experiment included a complete and detailed reporting of the number of men, man-hours, parts, and equipment used at all echelons of maintenance support. These data are summarized in Annex C.

c. Evaluation of the maintenance units (Discussion, para E of this section) is based on both military observations and the numerical data. The conclusions and recommendations (paras C and D) represent a consensus of the military officers who conducted and observed the experiment.

3. Maintenance Units Examined

Figure 4, following, depicts the channels of maintenance support provided to the tactical units. The maintenance functions at each level are described briefly below. A discussion of the performance of the various maintenance elements is presented in paragraph E of this section. Organizational charts for the maintenance units examined will be found in Appendix 1 of Annex A.

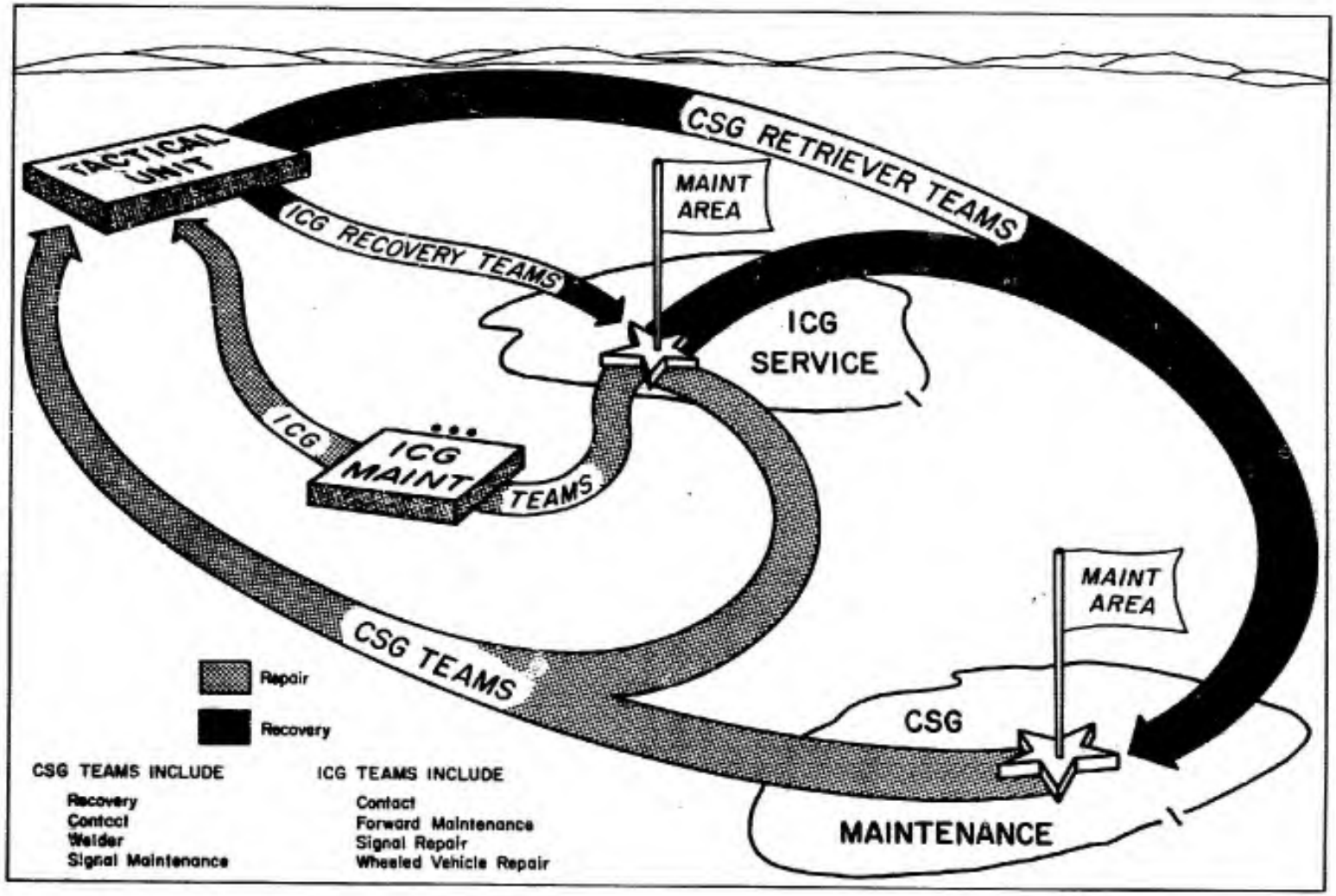

FIGURE 4 REPAIR AND RECOVERY CHANNELS

a. Maintenance Company, Composite Support Group

The CSG Maintenance Company furnished Field-Army- level maintenance support to the experimental units. This was the highest echelon of maintenance examined during the experiment. (When repairs were beyond the Maintenance Company's capability or when a lack of parts prevented repairs within a practicable time limit, the Maintenance Company resorted to administrative support.) The CSG Maintenance Company established and operated a maintenance and maintenance-supply point in support of the Integrated Combat Group. Within the general limitations of 3d echelon maintenance and a time limit of six working hours, the CSG Maintenance Company accomplished all repairs that were beyond the scope of the ICG Maintenance Platoon. On-site repairs were effected by the Contact Teams when possible; otherwise the unserviceable equipment was evacuated to the Maintenance Company area. The Maintenance Company delivered repair parts and replacement components to using units except in an emergency when it was more expedient for the unit to accomplish its own pick-up.

b. Maintenance Platoon, ICG Service Company

The Maintenance Platoon performed organizational maintenance on all TOE equipment, limited field maintenance, and certain Class II and Class IV supply and resupply of repair parts and replacement components for the Integrated Combat Group. The Forward Maintenance Teams of the Maintenance Platoon operated as close to the supported units as the tactical situation would permit, and performed on-site repairs that could be accomplished within one hour.

Back-up support for these teams was provided by the Maintenance Section of the ICG Maintenance Platoon. The Maintenance Section operated a control point from which it coordinated and supervised all maintenance functions performed within or for the Integrated Combat Group. Through use of contact teams, the Maintenance Section performed all repairs or component replacements that could be completed within three working hours, these repairs being performed on-site whenever possible.

When repairs were beyond their capability or the prescribed time limit, the Maintenance Section requested assistance from the Composite Support Group (CSG) Maintenance Company. If necessary, the Maintenance Section evacuated defective items to an area which would facilitate the use of the heavier repair or recovery equipment of the higher echelon. The Maintenance Section maintained a stock of frequently-required spare parts, from which it periodically replenished by unit delivery the stocks of spare parts carried by the Forward Maintenance Teams.

B. OBJECTIVE

Examine the performance of the maintenance elements of the Integrated Combat Group and the Field Army Composite Support Group in meeting the logistical requirements with respect to materiel maintenance, repair, and evacuation, as generated by the play of the tactical experiment.

C. CONCLUSIONS

1. The maintenance elements of the Integrated Combat Group and the Composite Support Group are capable of providing much more maintenance support than was required during the experiment. To the extent that the slice supported was representative, these elements should have no difficulty in meeting the requirements of a full ICG division of five companies. (Discussion: paras 1a, p. 24; 2a, 2b, p. 25; 3a, 3b, 3c, p. 26.)

2. The effectiveness of the maintenance units and system examined depends upon a ready supply of spare parts and replacement assemblies carried by the appropriate maintenance team or maintenance area. (Discussion: paras 1a, 1b, p. 24.)

3. Integration of specialized maintenance functions within the CSG Maintenance Company expedites maintenance and maintenance supply for all levels of maintenance support. (Discussion: para 1c, p. 24.)

4. On-site repairs on the battlefield are feasible for the majority of breakdowns and serve to expedite return of the disabled equipment to the using unit. (Discussion: para 1b, p. 24.)

5. The frequency of equipment breakdowns attributable to poor user maintenance indicates that an organic company maintenance capability beyond that of user maintenance is desirable for mechanized units. (Discussion: para 1d, p. 24.)

D. RECOMMENDATIONS

It is recommended that:

1. Company maintenance sections be retained in mechanized units.

2. Maintenance functions at the lower support level (i.e., the Maintenance Section of the ICG Maintenance Platoon) be broadened in scope to include such repairs as can be readily accomplished even though they require more than three hours' working time.

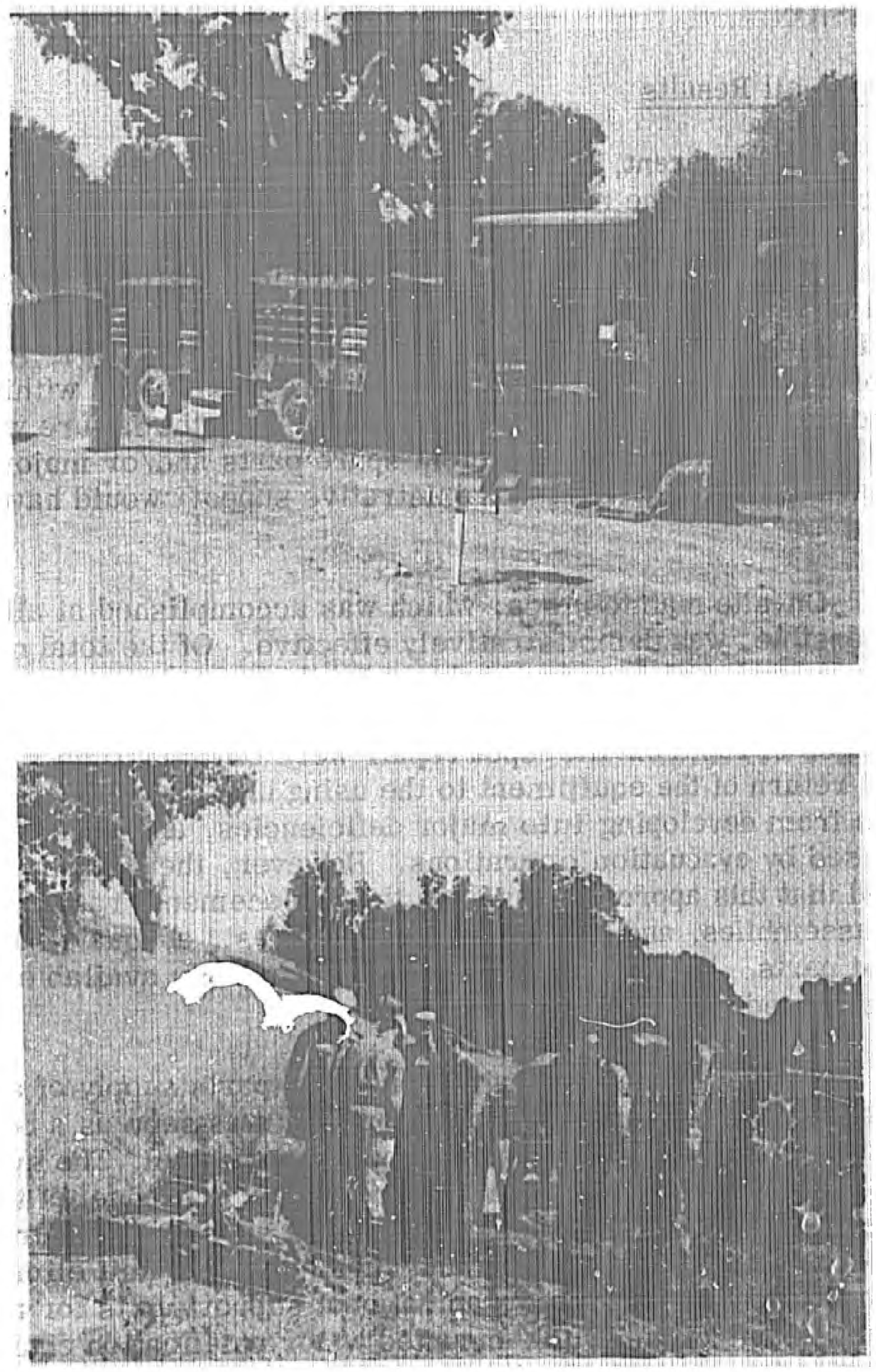

FIGURE 5 MAINTENANCE

ICG maintenance headquarters is pictured at top. Lower photo shows work on tank engine in field. Repairs or part replacements were performed on-site whenever possible.

E. DISCUSSION

1. Over-all Results

a. It is apparent, both from military observation and from the performance data, that the maintenance support system examined was well able to fulfill the demands generated by the tactical experiment. The great majority of jobs were completed well within the stiplulated time limits. Of the total of 786 repair actions recorded as to time, 691 or 88% were completed in less than two hours (see Table C-4 and Fig. C-1, Annex C). Military observers noted that in all cases where repair jobs within the scope of the examined echelons were not completed, the failure was due to a lack of spare parts. Had sufficient spare parts and/or major assemblies been available, very little administrative support would have been required.

b. On-site mai-tenance, which was accomplished at all levels whenever possible, was d_monstratively effective. Of the total of 880 repair actions recorded as to team, only 40 involved evacuation--i.e., the CSG Retriever and ICG Recovery Teams (Tables C-2 and C-3, Annex C). The advantages of rapid on-the-spot repair were obvious to observers. It expedited return of the equipment to the using unit, prevented minor deficiencies from developing into major deficiencies, and avoided further damage caused by evacuation operations. However, the military evaluators noted that this approach involves the replacement, rather than the repair, of assemblies, and thus depends upon a fast, adequate supply of replacement parts. When these items were not readily available, there was no time gained.

c. The integration of maintenance and parts supply of all technical services under a maintenance company was seen as a benefit by the military observers and the participating personnel. The system left no question in the minds of maintenance and supply personnel of the supported units as to who was responsible for parts supply or repair of any item. The combining of technicians and supplies in one unit eliminated shifting of equipment to various organizational support units for repair. For example, repair of the truck-mounted water purification equipment would otherwise involve both Engineer and Ordnance elements, and infrared equipment involves Signal, Ordnance, and Engineer responsibilities.

d. Although an examination of maintenance at the user level was not included in the experiment, observers and maintenance support personnel noted that numerous breakdowns were the result of poor crew maintenance (e.g., failing to perform routine service checks). While the forward teams from support units tried to correct such deficiencies and instruct user personnel, they were handicapped by not being members of the supported units. Company officers tried to supervise and control

preventive maintenance, but were often hard-pressed by other duties and not technically qualified. Observers were of the opinion that organic maintenance personnel within the tactical units were needed to remedy this situation.

e. Several interesting points with respect to the effort required of the maintenance units are brought out by the data showing breakdowns by type of vehicle and class of breakdown (Table C-1). Some 50% of all listed breakdowns were attributed to one vehicle type, the M-59 Armored Personnel Carrier. Since this vehicle type constituted only 20% of the total number of vehicles supported, it is apparent that it consumed a disproportionate amount of the total maintenance effort. With respect to type of breakdown, it is seen that some 75% of the total fell within six major classifications, and of these, electrical breakdowns (including radio) were by far the most prevalent.

2. Performance of the CSG Maintenance Company

a. The CSG Maintenance Company was obviously capable of providing much more maintenance support than was required for the tactical units supported during the experiment. In fact, the data suggests that the Maintenance Company is fully capable of supporting an ICG with its full complement of five companies. Of the total maintenance man-hours available in the Maintenance Company during the period of experimentation, only an estimated 3%* were required for the jobs attributed to this unit (Table C-5).

b. Another indication of the ability of the CSG Maintenance Company to fulfill its role is seen in the repair-time data for individual jobs. Some 85% of the recorded repair actions handled by the Maintenance Company required less than two hours repair time (Table C-2), and in only a few instances did recorded repair times approach or exceed the stipulated six-hour limit. As noted above, there was a large proportion (33%) of repair actions for which time was not recorded, but observation indicated that the great majority of these were jobs which were incompleted only because parts or tools were unavailable.

c. As might be expected, there was much variation among the various CSG maintenance elements with respect to the average distances and man-hours involved in their respective activities (see Table C-2). However, the over-all averages for the CSG Maintenance Company as a

* This figure includes a proportionate adjustment for a large percentage of repair actions for which time was not recorded. Presumably most of these were incompleted jobs--which in every case were due to a lack of parts or tools. It is assumed that if the proper items had been available, these jobs would have required the same average time as those completed. See explanation of Table C-5, Annex C.

whole give some indication of the typical repair job performed by this unit. The average job involved a travel distance of 5.5 miles and 23.4 minutes in travel time; it required a total expenditure of 2.1 man-hours, of which 1.4 man-hours were spent in travel and the remaining 0.7 man-hour was spent in actual repair action (Table C-2).

3. Performance of the ICG Maintenance Platoon

a. The elements of the ICG Maintenance Platoon proved capable of repairing the large majority of equipment failures that occurred during the experiment. As a unit, the ICG Maintenance Platoon performed 698, or 78%, of the total of 880 repair actions recorded as to team. (Table C-4).

b. The data also indicate that the workload presented far from taxed the capacity of the ICG Maintenance Platoon. Of the total of 16,320 man-hours available within the Platoon during the course of the experiment, only 1703 man-hours, or slightly more than 10%, were estimated as required by the demands upon this unit. (See Table C-5, and also the accompanying text for basis of estimate.) As noted previously, the units supported during experimentation represented only a portion of a combat group; however, on the basis of the estimate above, it appears that support of a full PENTANA division is well within the capacity of the Maintenance Platoon.

c. The Maintenance Platoon also demonstrated its capability insofar as it was able to complete the majority of its repair actions well within the assigned three-hour time limit: some 89% of the repair times recorded were less than two hours (Table C-3).

d. In view of the fact that the ICG Maintenance Platoon was able to perform the majority of repairs and used such a small proportion of its available manpower, the military evaluators were of the opinion that the scope of maintenance at this level might be profitably increased. Repairs such as replacement of final driver, power packs, and compensating-idler arms, require more than three hours working time, but could be easily accomplished by the Maintenance Section of the ICG Maintenance Platoon.

e. As noted previously, very little recovery of vehicles was required because of the effectiveness of on-site maintenance. The Recovery Teams of the ICG Maintenance Platoon accounted for only 20 out of a total of 698 repair actions recorded for this unit (Table C-3). However, when recovery action was necessary the simulated recovery vehicle, M-48, used in lieu of the authorized tank recovery vehicle, M-88, was inadequate. This was particularly true when operating in hilly and rough terrain. The M-48 lacked power, traction, and adequate recovery accessories.

IV. Medical

A. GENERAL

1. Concept and Scope

The basic concept represented in the medical portion of ICG Phase III Logistics experimentation was the same as that played in the other areas: direct support of the ICG subordinate elements by the ICG Service Company, which in turn is supported by an appropriate unit of the Composite Support Group. However, the actual examination of medical support was more limited in scope than the supply and maintenance experiments described in the preceding sections. The evaluation and data reported herein are concerned with treatment and evacuation only to, and including, the level represented by the ICG Aid Station (see Figure 6, following)*. Thus only the performance of the Medical Platoon of the ICG Service Company is considered in this report, this unit being responsible for all evacuation and support within the ICG area.

The medical experiment also differed from the other logistical experimentation in that it was planned and conducted entirely apart from any tactical experimentation. The workloads were generated by schedule rather than by the demands of a tactical situation, and there was no play of Aggressor action, security measures, etc. For the first half of the experiment the placement of casualties was limited to an area which would normally be assigned to a company. During the second half the area was doubled in size, although no changes in the medical organizations were made because of this increase. No casualties were placed after 1400 hours, and thus no search or recovery was made after dark.

2. Procedures Examined

a. As indicated above, the medical support system was activated by placement of casualties on the battlefield in platoon areas. The ICG Medical Platoon established a collecting point, called the Company Aid Post (COAP), behind the company area at a distance of 1500 - 5000 meters to the rear of the forward battle position. The Medical Platoon also operated the ICG Aid Station (See Figure 6). Operating from the COAP, and controlled by the senior aid man stationed there, were five 3-man aid-evacuation teams: one in support of each of the five platoons.

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* While evacuation was actually played one step beyond, i.e., to the Division Clearing Station, these activities were not subject to experimental control or extensive data collection. They are covered in the report prepared by the Chief, Medical Section, Logistics Liaison Division, USA CDEC ("Medical Evaluator's Report of Medical Experiment, Spring FY60, dated 1 Oct 1960").

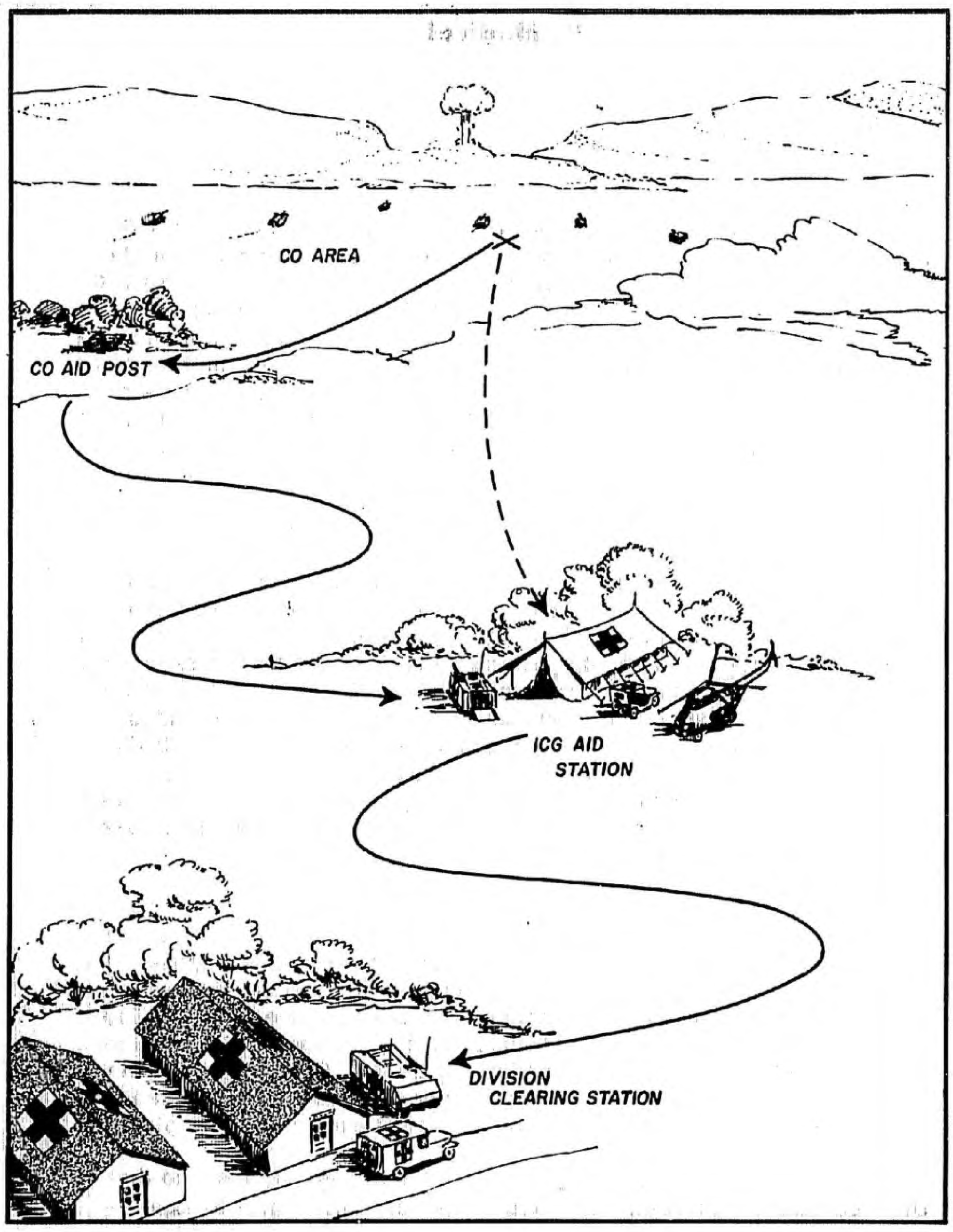


FIGURE 6 MEDICAL EVACUATION CHANNELS

These teams were mounted in M-59 Armored Personnel Carriers modified as armored ambulances.

b. Each aid-evac team was assigned either an area of responsibility or a line of approach to follow. Notification of the assessment and location of casualties was made to the COAP by the tactical commander. The aid-evac teams could monitor the tactical command net; however, their movements were controlled by the COAP, with which they were in direct radio communication.

c. The successive steps taken during the experiment were as follows:

1) Initial reporting of casualties by the tactical unit.

2) Battlefield search and recovery by aid-evac teams.

3) Treatment of the casualty by the aid-evac team. If more than one casualty was placed in the same area, the team was required to sort the casualties and establish priorities for treatment.

4) Evacuation of casualties either via the COAP (Path 1) or directly to the ICG Aid Station (Path 2), as determined by communication with the senior aid man at the COAP.

5) Treatment while enroute to either the COAP or ICG Aid Station.

6) Evacuation from the COAP to the ICG Aid Station, for casualties not evacuated directly from the battle area to the latter station.

d. As noted previously, the ICG Medical Platoon was responsible for all evacuation and support within the ICG area. The scientific data-collection effort terminated when a casualty departed the ICG Medical Platoon zone of responsibility. Further evacuation, from the ICG area to the field army area, was the responsibility of Field Army medical units and accordingly is not within the scope of the present experiment and report.

3. Experimental Design

The experiment was planned so that the workload presented to the ICG Medical Platoon covered the range from an easily accomplished mission to a very difficult mission. Casualties were varied both as to number and the rate at which they were "generated" - that is, various numbers of casualties were placed at preselected sites over varying time spans. The casualty-time combinations used were based on a preliminary study, made by the SRI Operations Research Study Group, employing

a mathematical model and computer simulation. Nine different combinations were repeated as follows:

TABLE 1

NUMBER OF REPETITIONS OF CASUALTY-TIME COMBINATIONS

Time Span for Placement	Number of Casualties		
	20	50	80
1 Hour	11	1	2
3 Hours	2	3	2
5 Hours	2	2	2

Thus, as indicated by Table 1, there was a total of 27 record runs during which a total of 1080 individual casualties were generated to be located, sorted, treated, and moved to the rear through medical channels.

Casualty assessment was based on a random mix of wounds, injuries, and illnesses, with actual descriptions of wounds and moulages used in simulation of wounds to provide realism in the sorting and treating of casualties. For the purposes of data collection and evaluation, casualties were divided into three classes, with critical "delay time limits" for treatment denoted as follows:

Immediate	-	2 hours
Emergency	-	6 hours
Delayed	-	12 hours

4. Basis of Evaluation

The collection of experimental evidence entailed primarily a recording of the elapsed times during successive steps in the location, recovery, treatment and evacuation of casualties. A comparison of these for the various casualty-time combinations afforded some indication of the factors affecting performance. For the purpose of the experiment, performance as such was measured as the ratio of the number of successful evacuations to the total number of evacuations. A successful evacuation was defined as one where treatment at the ICG

Aid Station was completed before expiration of the casualty's delay time limit.

The numerical data (summarized in Annex D) are cited whenever they offer evidence pertinent to the discussion presented in paragraph E of this section. It should be noted, however, that most of this discussion is based necessarily on the observations of the military and medical evaluators who witnessed the experiment. That is, the points made largely reflect the opinions of qualified observers rather than statistical analysis of the numerical data. No attempt was made to define "effective" performance in numerical terms; furthermore, the experiment was not designed to compare different organizations or procedures but only to record the performance of one system against varying workloads.

The conclusions and recommendations (paragraphs C and D) also reflect the military judgment and experience of the senior officers who conducted and observed the experiment.

B. OBJECTIVE

As stated above, the medical experiment was conducted within the context of the over-all objective of the ICG Phase III Logistics experiment, which included support by the Composite Support Group (see Section I, para B) . However, the examination of medical support was limited to the following specific objective:

To examine the performance of the Medical Platoon of an Integrated Combat Group in meeting the medical requirements in the areas of triage and evacuation of medical casualties.

C. CONCLUSIONS

1. The concept of forward medical support, as examined, is considered practicable and effective. (See Discussion, para 1a, p. 33.)

2. The performance of the ICG Medical Platoon in the areas of forward evacuation and triage was considered successful as tested during the experiment. This included the use of three-man aid-evacuation teams mounted in APC ambulances, with control and back-up by a company collecting post. (See Discussion, paras 1a, p. 33; 2, p. 35; 3, p. 36.)

3. The performance of the ICG Medical Platoon, as measured by the percentage of casualties "successfully" evacuated, is a direct function of the availability of ambulances. (See Discussion, para 1b, p. 35.)

4. One aid-evacuation team is capable of supporting an area larger than platoon-size. (See Discussion, para 3b, p. 36.)

5. The APC ambulance is adequate for evacuation within the ICG area, although modification is required for easier loading and unloading of litter casualties. (See Discussion, para 4, p. 36.)

6. Adequate communication and control is afforded by the medical command net combined with the capability of aid-evacuation teams to monitor the company command net. (See Discussion, para 5, p. 37.)

D. RECOMMENDATIONS

It is recommended that:

1. The three-man aid-evacuation team be the basic cellular unit of the forward medical service in armored units. The team to be mounted in an armored ambulance, operate on a medical command net, and be equipped with an additional receiver to be used for monitoring the company command net.

2. Future experimentation be conducted to determine the maximum capacities of the company collecting post, or of several collecting posts, and the maximum size unit and area which can be supported by a single aid-evacuation team.

3. Means of improving control and operational techniques be sought to increase the availability of ambulances for rapid dispatch to casualty locations.

4. Better means of loading and unloading litters be devised and the APC ambulance be modified accordingly.

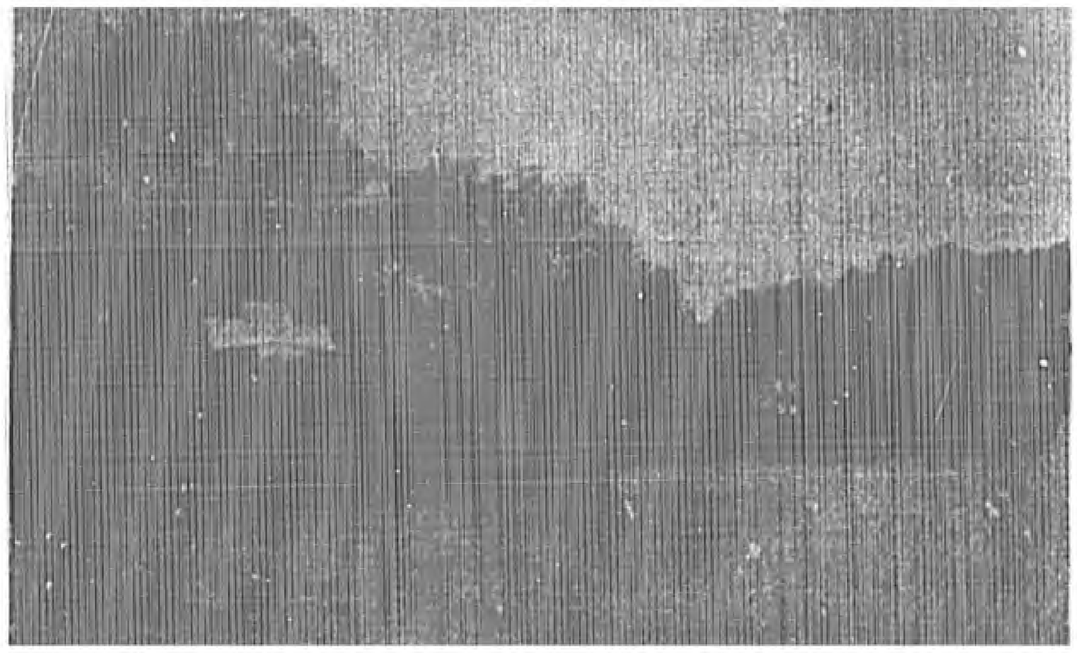
5. Medical training of enlisted medical personnel be augmented to improve their ability to sort and apply life-saving procedures during front area evacuation; and a trained medical technician be assigned to the company collecting post.

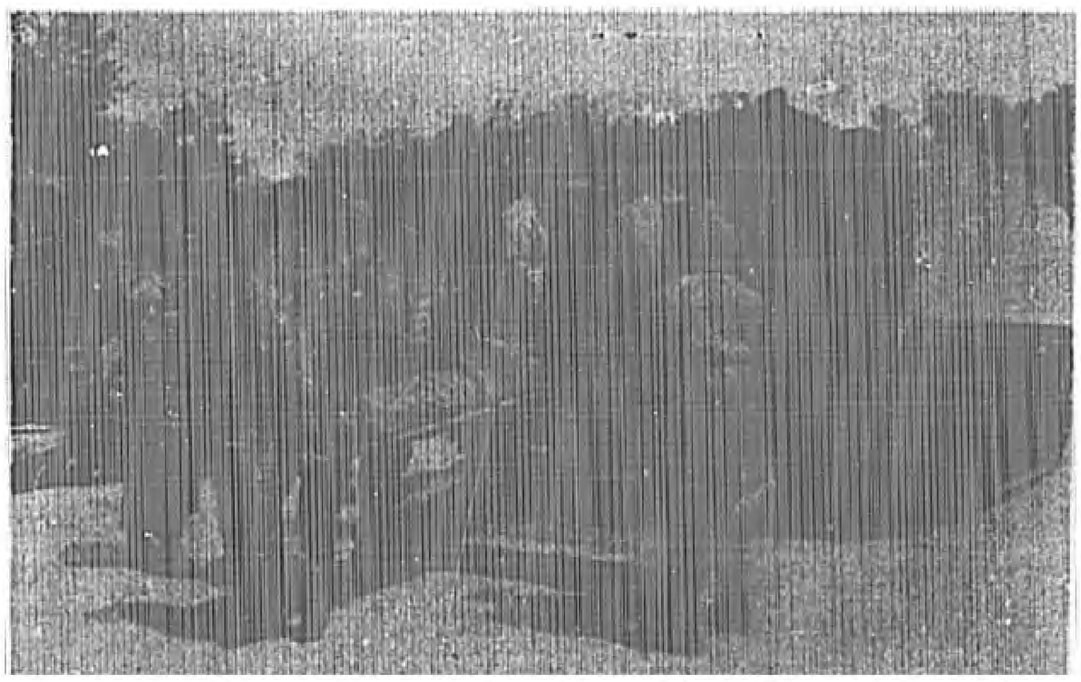
6. Air evacuation, rather than ground vehicles, be considered for evacuation to the rear of the ICG Aid Station.

E. DISCUSSION

1. Over-all Results

a. The concept of medical support followed, and the system examined, were considered by the observers to be generally effective. This is also suggested by the data. Out of a total of 1080 casualties generated during the experiment, 1074 were evacuated (Table D-1, Annex D). The majority (77%) of the latter were "successfully" evacuated - i.e., they received treatment at the ICG Aid Station before expiration of the delay time limits prescribed for their respective wounds (Table D-9). Furthermore, when Performance, or the ratio of successful evacuations to total evacuations, is plotted against the casualty/hour rate represented by the various casualty-time combinations examined, the performance trend suggests a very gradual decline rather than an abrupt falling-off as the workload increases from a low rate of 4





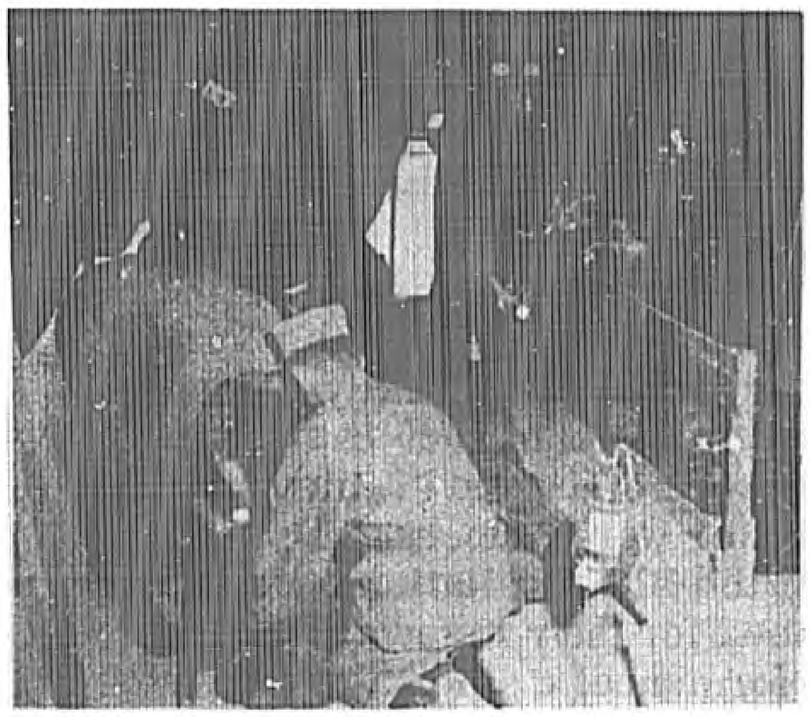


FIGURE 7

ICG AID STATION

casualties per hour to a high of 80 casualties per hour. (See Figure D-2, Annex D.)

b. A study of the data also reveals that factors other than workload per se had a marked effect upon over-all performance of the ICG Medical Platoon. Essentially, these factors involved the availability of ambulances, as measured by "assignment time," or the time interval between occurrence of the casualty and the assignment of an ambulance for evacuating that particular casualty. Figure D-1 shows the decline in the Performance measure as assignment time increases. Figure D-1 also depicts the decreases in Performance as plotted against the over-all times (from occurrence to completion -of-treatment) for the alternative evacuation routes used. The point to be noted is that the latter curves show essentially the same rate of decrease in Performance as the assignment-time curve. Although there is an over-all time difference between the two paths, this difference may be attributed to the difference in assignment times (Table D-5) and also to delays at the COAP (Path 1). The detailed data show that the other times intervening between assignment time and completion of treatment (travel times, loading and unloading times, treatment times) were approximately the same for both paths and thus may be considered as constants. In other words, the performance of the Medical Platoon by either evacuation route is shown as being directly related to the availability of ambulances at initial assignment and also, in the case of Path 1, at the COAP. This in turn suggests that the percentage of successful evacuations for a given number of ambulances could be increased by improving the availability of these ambulances - e.g., by using faster vehicles and/or improving holding and sorting techniques.

2. Company Aid Post (COAP)

In the opinion of the evaluators, the establishment of a company collecting point is a vital cog in the medical support concept, and the experiment clearly demonstrated the over-all value of this post. The full capability of the COAP was not fully exploited or explored during the experiment, but its capacity was obviously greater than that required for five platoons. In fact, it appeared that one collecting point per company front would be adequate, given the necessary trained personnel, equipment, and communications. The adoption of an area-type medical coverage was considered by the evaluators to offer definite advantages over the type of coverage which provides for the specific support of one platoon by one ambulance. The system of aid-evacuation teams, with central control from the company collecting point, permits sorting to be performed at platoon aidman level, and insures that priorities for evacuation are based on the over-all battlefield evacuation requirements, and not on the isolated situation. Furthermore, as was demonstrated during the experiment when the covered frontage was extended, one APC ambulance is capable of supporting more than one platoon area. The observers felt,

however, that a full evaluation of the company collecting point concept and its best application would require further experimentation using multiple collecting posts, additional radio capabilities, increased displacements, and facilities for more rapid evacuation.

3. Aid-Evacuation Teams

a. Three-man aid-evac teams, mounted in ambulance APCs, were used throughout the record runs of the experiment. Two-man teams were used, but discarded, during the three weeks of practice runs. While this size team was apparently able to locate and provide first-aid treatment to casualties, the loading and unloading of casualties was considered too much for only two men to cope with. More important, they were unable to treat casualties enroute, since both were kept busy in their respective roles as driver and vehicle commander/radio operator. At the same time, it was found during the practice runs that the platoon aidman, confined to riding in the platoon leader's tactical vehicle, was not free to locate and treat casualties except those who happened to be directly in the path of the vehicle. He was forced to go where the platoon leader traveled, or else to dismount and lose his platoon. Accordingly, the platoon aidman was removed from the platoon leader's vehicle and was placed in the APC ambulance as the senior member of the three-man aid-evac team.

b. The three-man aid-evacuation team employed during the experiment was considered by the military evaluators as an effective basic element of the medical support system. It afforded the flexibility found lacking in the two-man team during practice runs. As noted above (para 2), the size unit and total area capable of being covered by one team remain to be resolved; however, the experiment indicated that one aid-evac team can successfully cover a larger unit than one platoon and a larger area than 3000 yards, given adequate means of communication and control.

4. Ambulances

The M-59 armored ambulance used during the experiment was considered by the military observers to be adequate for forward battlefield evacuation. Its virtues were seen in the mobility and protection afforded to patients and medical personnel, and the fact that treatment enroute can be more readily performed than in a jeep-type ambulance. However, the M-59 presented some difficulties in the loading and unloading of litter patients, and the evaluators were of the opinion that certain modifications might be made to render this operation less awkward. The evaluators also considered the M-59 ambulance too slow as a means of evacuation to the rear of the company collecting post, and were of the opinion that air evacuation was both practicable and preferable for rear-evacuation.

5. Communications

Control was seen by the evaluators as the most important single factor in the system of forward medical support examined - and control, of course, is dependent in turn upon adequate radio communication. Since there were few communication difficulties during the experimental runs there was no measurement of the effect of inadequate communication; on the other hand, the observers considered that the effectiveness of the medical support rendered could be largely attributed to the adequacy of the nets provided. The ability to monitor the company command net gives the aid-evac teams a rapid means of ascertaining the location of casualties, and of keeping abreast of the tactical situation. Although tactical messages were not played into the experiment as conducted, the evaluators suggested that having an additional receiver mounted on the APC ambulance for this purpose would prove advantageous, so that the other set could be used solely for medical command net messages. The use of the medical command net was seen as essential in the effective operation of the company collecting post. This net provided the necessary flexibility, permitting ambulances to be readily positioned, dispatched, and diverted as necessary to support the patient load.

6. Personnel

It should be emphasized that the experiment as conducted was not intended to afford an evaluation of medical care and treatment as such, although such procedures were played as realistically as possible in order to permit evaluation of the medical aid-evacuation system as a whole. Nonetheless, the medical observers noted requirements for certain medical skills as essential to the system. They were of the opinion that greater emphasis must be placed on the medical training of enlisted medical personnel, so that platoon aidmen are capable of performing the proper sorting and first-aid treatment of casualties at, and enroute from, the battle area. In addition, the type medical service required at the company collecting post is in many instances beyond the capability of the average aidman. The presence of a highly-skilled medical technician at the collecting post is considered necessary to insure that patients are fit for evacuation from the battlefield to the ICG Aid Station, which involves the performance of certain life-saving procedures beyond the scope of the trained enlisted man.

ANNEXES

Annex A

Conduct of Logistics Experimentation

1. ORGANIZATIONS

a. Composite Support Group

(1) Logistical support requirements of the Integrated Combat Group were provided by representative organizational slices of advanced field army support elements. For the purpose of the Phase III experiment these were combined into a Composite Support Group consisting of the following:

a) Composite Support Group Headquarters

b) Composite Maintenance Company

c) Medical Battalion (-)

d) Movements Company

(2) Under the PENTANA concept, the Composite Support Group is an element of the field army integrated logistic system. It is organic to the Field Army Support Brigade.

(3) The base of operations for the Composite Support Group is the Forward Intransit Depot Organization (FIDO). The FIDO is not a supply dump or a fixed service installation; it is the terminal of a line of communication directly in rear of the combat unit it supports. The mission of the FIDO is to receive, process and transport to the supported units bulk logistic support. The FIDO consists of two elements, a Logistic Control Center (LCC), organic to the headquarters, which furnishes staff supervision, policy guidance, and planning functions; and the operating elements which actually perform the services required.

(4) The FIDO was located at Camp Roberts, approximately 35 miles from Hunter Liggett Military Reservation. All units of the Composite Support Group operated from the FIDO with the exception of the Composite Maintenance Company, which was positioned at Hunter Liggett Military Reservation.

b. Integrated Combat Group

Direct support to the Integrated Combat Group tactical units was provided by the service company under the staff supervision of the Integrated Combat Group Headquarters and Operations Section. The Integrated Combat Group Service elements were organized as follows:

(1) Headquarters and Operations Section

(2) Service Company

a) Headquarters Section

b) Maintenance Section

c) Supply Platoon

d) Medical Platoon

Organization charts and tables of personnel and major equipment for all logistic elements are shown in Appendix 1.

c. Tactical Units

Although the number of units supported approximated that of an Integrated Combat Group, there was no actual combat group fielded for this experiment. The units supported were three separate tactical experimental candidates, namely, "A" Echelon, INFANA, and MOMAR, plus a Range Company, two Engineer platoons and a Division Engineer Company Slice. Only two of the candidate infantry companies were engaged simultaneously in tactical experimentation and only one of these was issued Class V ammunition. There was no group commander, no group staff, and, although all units were mechanized, no standardization of weapons, vehicles or communications existed. Specific information regarding size, composition, and equipment of the tactical experimental candidates are listed in the report of experimentation, "Evaluation of Tactical Units, Phase I," (CDOG 60T8).

2. LOGISTIC CONCEPTS

a. Supply

(1) Unit Delivery: The unit delivery concept examined was based on supply distribution and delivery by higher echelon to lower echelon to the user (see Figures 1 and 2, pp. 6, 7). The Movements Company of the Composite Supply Group made all deliveries to the Integrated Combat Group. The Supply Platoon of the Integrated Combat Group Service Company delivered to the tactical units. The unit commanders completed the distribution to the user. In the case of gasoline, the Supply Platoon delivered to the individual vehicle.

(2) Scheduled Resupply: Under this procedure the tactical commander received an automatic daily issue of a predetermined fixed quantity of Class I, III and V supplies. The schedules were prepared by the logistics officer of the Logistic Control Center and forwarded to the using company commander through the Integrated Combat Group S-4. The

company commander's only responsibility for his supply needs was to inform the S-4 by 0630 on the day of issue of any changes desired in quantities or types of supplies scheduled for delivery. These changes were then forwarded, without consolidation, by the S-4 to the ICC for supply action. No units below FIDO level were authorized to maintain reserve stocks; consequently issues had to be made daily. Classes II and IV were issued on request and not included on resupply schedules.

(3) Unitized Loads:

(a) The FIDO Supply Company prepared unitized loads daily for each company based upon the quantities stipulated in the resupply schedules as adjusted by plus or minus variables submitted by the tactical unit commander.

(b) The FIDO Movements Company transported the unitized loads by air or land to the Integrated Combat Group Service Company.

(c) The Service Company Supply Platoon transferred the unitized loads from the Movements Company's vehicles to Supply Platoon vehicles. (During the first part of the experiment no fork lifts were available. Consequently unitized loads could not be transferred in-toto).

(d) The Supply Platoon moved the supplies to the tactical unit. Here the unitized loads were broken down and distributed by tactical personnel within the tactical unit.

(e) Shipments of gasoline were accomplished in the same sequence but separate from unitized loads. In the absence of sealed-bin containers, tank trucks were used from FIDO to Service Company. The gasoline was then pumped into rolling liquid transporters and 1,200-gallon tank trucks for delivery to the user.

(f) Simulated Class I supplies were delivered using containers of the same cube and weight as "C" rations. This applied also to Class V supplies. Quantities issued were based upon the strengths of the supported units and expenditures of Class V simulators during the conduct of the exercise.

(4) Aerial Delivery:

Two methods of aerial delivery were utilized; air-land and air-drop. Approximately 20% of scheduled resupply was air-landed. Emergency supplies were also air-landed (Figure 2, p. 7). Delivery by the air-drop method was conducted as a side experiment to obtain basic date on loading and rigging times and unloading times over the drop zone.

b. Maintenance and Repair (Figure 4, p. 20)

(1) Company Level:

Tactical units were limited to performing only that maintenance that could be accomplished by the user. Essentially this consisted of before-, during-, and after-operations services. Drivers and operators assisted mechanics or repairmen from higher support echelons when emergency or on-site repairs were required.

(2) Maintenance Platoon, Service Company, ICG:

(a) Forward Maintenance Teams

Close maintenance support was furnished by Forward Maintenance Teams organic to and under the control of the Maintenance Platoon. Operating as close to the supported units as the tactical situation would permit, these teams performed on-site maintenance on those repairs that could be accomplished within one hour. Between tactical situations when the candidate unit occupied an administrative assembly area, the teams performed preventive maintenance adjustments, services, and replaced components. If the required repairs and replacements were not within their capabilities or could not be accomplished within the one-hour limit the NCO in charge of the team called for assistance from the Maintenance Platoon. Forward Maintenance Teams carried a small quantity of fast moving repair parts, Signal components, and emergency oils and lubricants.

(b) Group Maintenance Section

The Group Maintenance Section of the Maintenance Platoon provided the back-up support for the Forward Maintenance Teams. Through the use of contact teams they performed all repairs or component replacements that could be completed within three working hours. On-site repairs or replacements were stressed. The Group Maintenance Section operated as follows:

1) Established and operated a group maintenance control point from which it coordinated and supervised all maintenance functions performed within or for the Combat Group.

2) Performed organizational and limited field maintenance and component replacements according to the time limit prescribed and as was within their capabilities.

3) Repaired secondary assemblies and components within their capabilities and for which spare parts and tools were available.

4) Performed recovery and evacuation services for supported units including delivery of first echelon replacement items and spare parts.

5) Requested maintenance assistance from the Composite Support Group Maintenance Company when repairs were beyond their capability or prescribed time limit. When this was required the Group Maintenance Section evacuated the equipment, if necessary, to an area where on-site repairs could be readily accomplished, or which would facilitate the use of the heavier repair or evacuation equipment of the higher echelon.

6) The Group Maintenance Section maintained a stock of fast moving spare parts. It periodically replenished by unit delivery the stocks of spare parts carried by the Forward Maintenance Teams.

(3) Composite Maintenance Company:

The Composite Support Group Maintenance Company furnished the Field Army level maintenance support to the experimental units. This was the highest echelon of maintenance examined during the experiment. The Composite Maintenance Company operated as follows:

a) Established and operated a maintenance point and maintenance supply point in support of the Integrated Combat Group.

b) Accomplished repairs that were beyond the scope of the Maintenance Platoon of the Integrated Combat Group. On-site repair was stressed and was accomplished by use of Forward Contact Teams. The scope of repair was limited generally to 3d echelon and a six working hours' time limit. If parts were not readily available, on-site repair was not performed and the unserviceable equipment was evacuated to the Maintenance Company area.

c) Delivered repair parts and replacement components to using units except in an emergency when it was more expedient for the unit to accomplish its own pick-up.

d) Coordinated with administrative facilities for support that was beyond their own capability or when lack of parts prevented repairs within a reasonable time.

(4) Replacement Equipment:

The experimental tactical units were required to reconstitute to 100% of men and equipment prior to the start of each tactical exercise. To insure this accomplishment, reserve stocks of vehicles, radios and other major items of equipment were retained in the general vicinity of

the tactical areas, and at all echelons of maintenance. These were interjected into the experiment at any time a breakdown occurred in which the repair could not be effected in sufficient time for the item to be present at a required reconstitution. Although this insured the uninterrupted flow of the tactical program it represented a 30% increase in the combat material supported.

c. Transportation

(1) Integrated Combat Group:

The Supply Platoon of the Service Company furnished all transportation requirements for the Combat Group. Other than normal dispatching no controls or other movement functions were imposed.

(2) Composite Support Group:

(a) The Movements Company of the Composite Support Group supplied all transportation, both air and ground for the FIDO. The company operated under and was coordinated by the LCC Movements Officer. The LCC Movements Officer established a forward movements control point at the ICG Service Company area from which the return movements of vehicles were controlled, and guidance to FIDO aircraft operating in the ICG area was furnished.

(b) Air-drops were examined as a separate function and were governed by scenario rather than the play of the tactical situation. Messages were sent to the ICG S-4 by the project team, which designated emergency shipments to surrounded units. The sequence of resultant actions were as follows:

1) ICG, S-4, notified the LCC Supply Officer of the air-drop mission. The Supply Officer advised the CO of the FIDO Supply Company. The cargo was packaged and delivered to the QM Aerial Delivery Team where it was prepared for air-drop.

2) The LCC Supply Officer advised the Movements Officer of the time that the cargo would be ready for loading, as well as the desired time of arrival, location of the drop zone, and other pertinent details.

3) The ICG, S-4, notified the tactical unit of the actual time of arrival of the aircraft over the drop zone. This information was furnished the ICG, S-4 by the Forward Movement Control Point.

4) Communication was established between the Forward Movement Control Point and the aircraft, thereby maintaining maximum coordination between the receiving unit and delivering transport.

5) Cargo, parachutes and rigging were recovered by the tactical unit. Parachutes and rigging were turned over to the ICG Service Company where they were classified as retrograde cargo and returned to the FIDO Supply Company on the next available transportation.

d. Medical (Figure 6, p. 28)

(1) The medical experiment was conducted as a separate entity. Predetermined numbers and mixes of casualties were positioned on the ground prior to the start of each day's record run. The personnel utilized as casualties were furnished by one of the three tactical units upon rotation at the end of each week from the tactical experimentation area. No particular tactical postures were employed. There was no Aggressor play.

(2) For the first half of the experiment the placement of casualties was limited to an area which would normally be assigned to a company; during the second half the area was doubled. No change in medical organizations were made because of this increase.

(3) It was assumed that the accepted doctrine for care of sick and wounded by tactical troops was in effect, i.e., that all troops would be trained in self and "buddy" treatment and that commanders would not abandon the sick and wounded.

(4) No casualties were placed after 1400 hours. No search and recovery was made after dark.

(5) The medical support system was activated by placement of casualties on the battlefield in platoon areas. The Integrated Combat Group Medical Platoon established a company collecting point within the company area at a distance of from 1500 to 5000 meters to the rear of the forward battle position and also operated the ICG aid station. Emanating from and controlled by the senior aid man stationed at the company collecting point, were five 3-man aid evacuation teams; one in support of each of five platoons. These teams were mounted in M-59 Armored Personnel Carriers modified as armored ambulances.

(6) Each aid evacuation team was either assigned an area of responsibility or a line of approach to follow. Notification of assessment and location of casualties was made to the company collecting point by the tactical commander. The aid evacuation team had the capability of monitoring the tactical command net and communicating with the company collecting post. Their movements, however, were controlled by the company collecting post.

(7) Since the concept of this experiment provided for all phases of medical support the steps taken throughout the experiment in order of occurrence were as follows:

a) Initial reporting of casualties by the tactical unit.

b) Battlefield search and recovery by aid evacuation teams.

c) Treatment of the casualty by the aid evacuation team. If more than one casualty was placed in the same area, the aid evacuation team was required to sort the casualties and establish priorities for treatment.

d) Evacuate casualties to the company collecting post or direct to the ICG Aid Station, as determined by the senior aidman.

e) Treatment while en route.

(8) Casualties were sorted for treatment and/or evacuation under the following classifications:

a) Immediate

b) Emergency

c) Delayed

(9) The ICG Medical Platoon was responsible for all evacuation and support within the ICG area. Scientific measurement and data collection was terminated when a casualty departed the ICG Medical Platoon area of responsiblity. Evacuation from the combat group area to the field army area was the responsiblity of Field Army medical units.

3. EXPERIMENTAL SITUATIONS

a. With the exception of the Medical and Aerial-Delivery portions of the experiment, the Logistical Experiment was predicated upon the actual demands of the tactical units undergoing concurrent experimentation. No additional postures or enemey action were imposed. The lack of rough-terrain type material-handling equipment, the requirement for absolute and continuous support of the tactical situation, and the absence of adequate Aggressor forces precluded movement of the logistical service unit areas and imposition of enemy action. Accordingly, with those exceptions noted above, there were no schedules or scenarios prepared specifically for the logistics experimentation itself.

b. For the Medical portion, task scenarios were followed and casualties were scheduled for each day's experimentation. A sample medical scenario (Task Number 2 - "Medical Service in support of an ICG in the attack"), and a typical medical casualty placement schedule for one day's action are shown in Appendix 2.

c. Similarly, a sample aerial delivery scenario and an excerpt from the aerial delivery schedule are presented in Appendix 3.

4. COMMUNICATIONS

Since the tactical units were not equipped with radios of one common band it was necessary to disregard types and numbers of radios used within the logistical elements. Only the ability to communicate with supported and supporting units was considered.

5. CONTROL AND DATA COLLECTION

a. The controller organization for the logistics experiment is shown in Figure A-1. Controller personnel recorded the required experimental data pertaining to the various logistics functions as follows:

1) Field Maintenance Controller Group: This organization had the responsibility of recording in terms of time, men, and equipment, the repair of maintenance casualties by the forward Maintenance Teams, the ICG Maintenance Platoon, and the FIDO Maintenance Company.

2) Supply Function: The Supply Controller Organization recorded activities of the Supply Platoon, ICG Service Company, and the FIDO Service Company.

3) Movements Function: The Movements Controller recorded the movement of all supplies from and to the FIDO area.

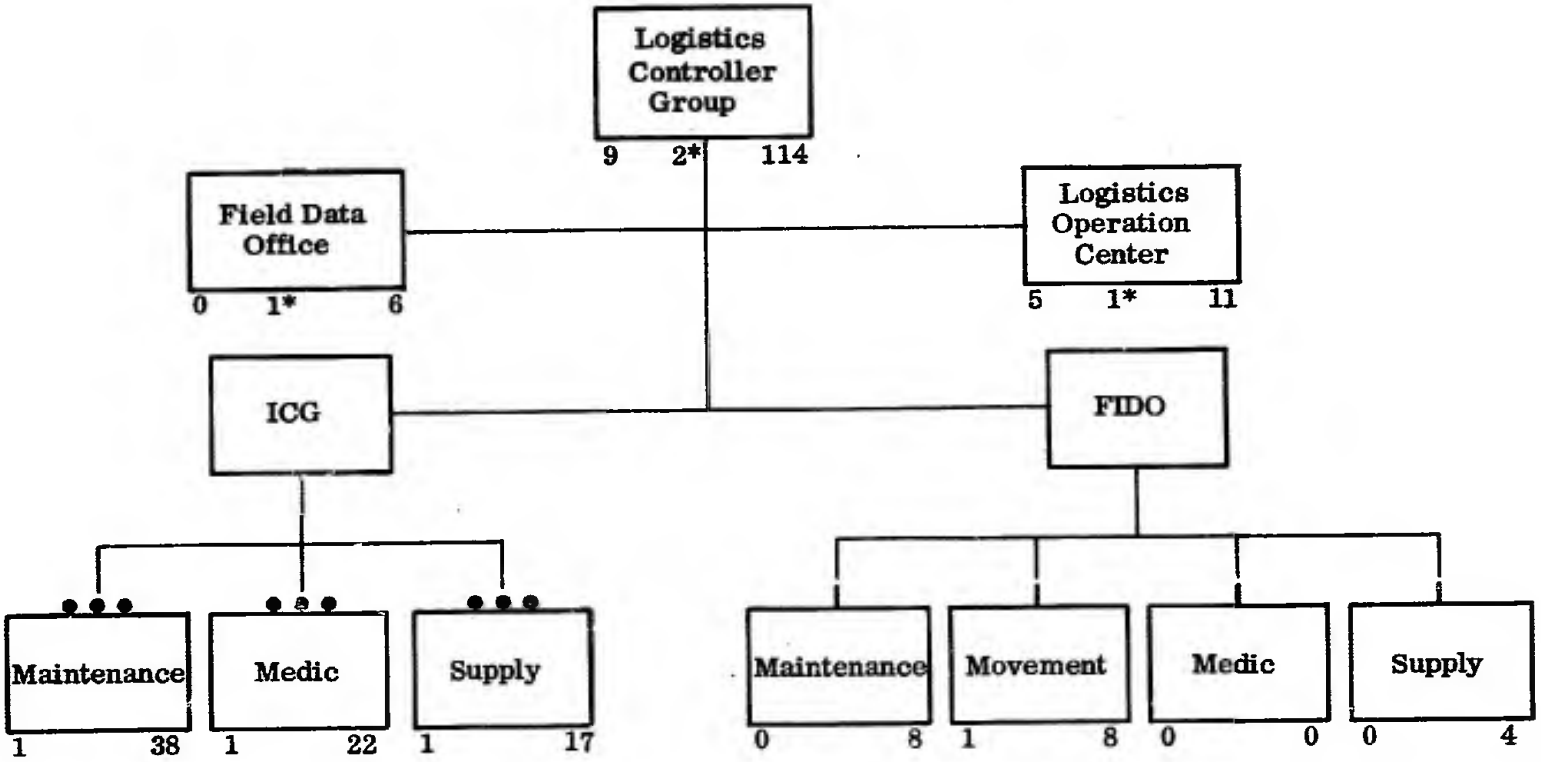
4) Medical Function: The Medical Controller Organization recorded all medical activities including treatment and evacuation of casualties from the battlefield to the ICG treatment section.

5) FIDO Headquarters Controller Group: The mission of this group was to gather logistics data concerning the FIDO Operation.

b. Each field controller was assigned a particular job and was furnished with a packet of the necessary data forms at the beginning of each day's run. The completed forms were collected upon his return from the field, were checked by the chief controller, and then were turned in for reduction and analysis by the scientific staff.

FIGURE A-1

LOGISTICS CONTROLLER ORGANIZATION

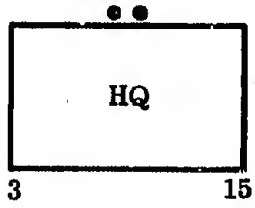


* Data Correlation Personnel

APPENDIX 1
LOGISTICS ORGANIZATION CHARTS

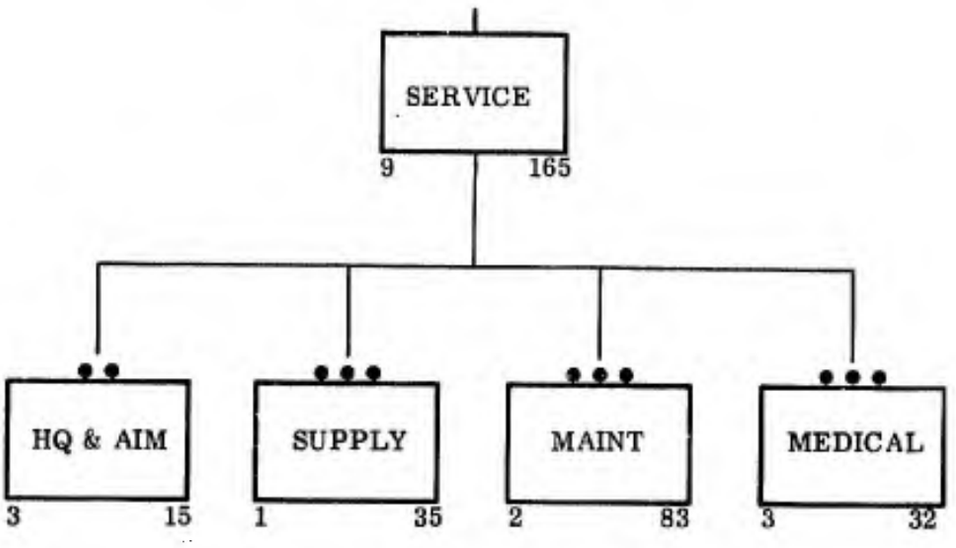
HEADQUARTERS

HEADQUARTERS AND OPERATION COMPANY, ICG



PERSONNEL	1 Log Off/S-4 1 Asst Log Off/S-4 1 Sig Off 1 Sr Sup Specl 1 Sup Specl 1 Med Specl 1 Comm Chief	3 Dvr/Rad Opr 1 Sr RTT Opr 2 RTT Opr 2 Clerk 1 Msg Cen Chief 2 Msg Cen Clk/Dvr
VEHICLES	4 Truck, utility, 1/4-T, 4x4 2 Truck, cargo, 3/4-T, 4x4 1 Van, V83 or AN/GRC 26	
COMM	2 Set, Radio, AN/VRQ 3 3 Set, Radio, AN/VRC 9 1 Set, Radio, AN/GRR 5 2 Set, Radio, AN/GRC 19	

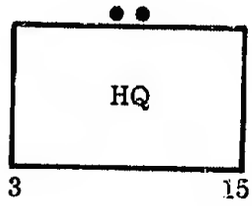
SERVICE COMPANY ICG



VEHICLES	14 Truck 1/4-T 5 Truck 3/4-T 34 Truck 2 1/2-T 1 Wrecker 5-T M62 2 WPU Truck Mtd, 1500 GPH	7 APC M-59 4 Tank M-48 8 Trailer 1/4-T 3 Trailer, water 400 Gal 28 Trailer 1 1/2-T
COMM	1 AN/VRQ 2 2 AN/VRQ 3 1 AN/GRR 5 10 AN/VRC 9 7 AN/PRC 9	4 AN/VRC 10 4 AN/VRC 15 2 AN/GRC 19 24 AN/VRC 22

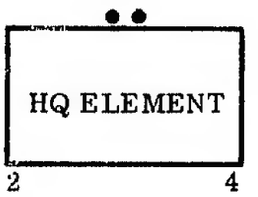
HEADQUARTERS

HEADQUARTERS AND OPERATION COMPANY, ICG



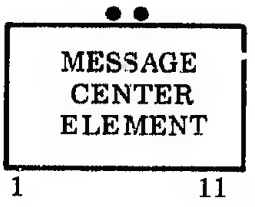
PERSONNEL	1 Log Off/S-4 1 Asst Log Off/S-4 1 Sig Off 1 Sr Sup Specl 1 Sup Specl 1 Med Specl 1 Comm Chief 3 Dvr/Rad Opr 1 Sr RTT Opr 2 RTT Opr 2 Clerk 1 Msg Cen Chief 2 Msg Cen Clk/Dvr
VEHICLES	4 Truck, utility, 1/4-T, 4x4 2 Truck, cargo, 3/4-T, 4x4 1 Van, V83 or AN/GRC 26
COMM	2 Set, Radio, AN/VRQ 3 3 Set, Radio, AN/VRC 9 1 Set, Radio, AN/GRR 5 2 Set, Radio, AN/GRC 19

HEADQUARTERS ELEMENT, HQ & MSG CENTER
SERVICE CO, ICG



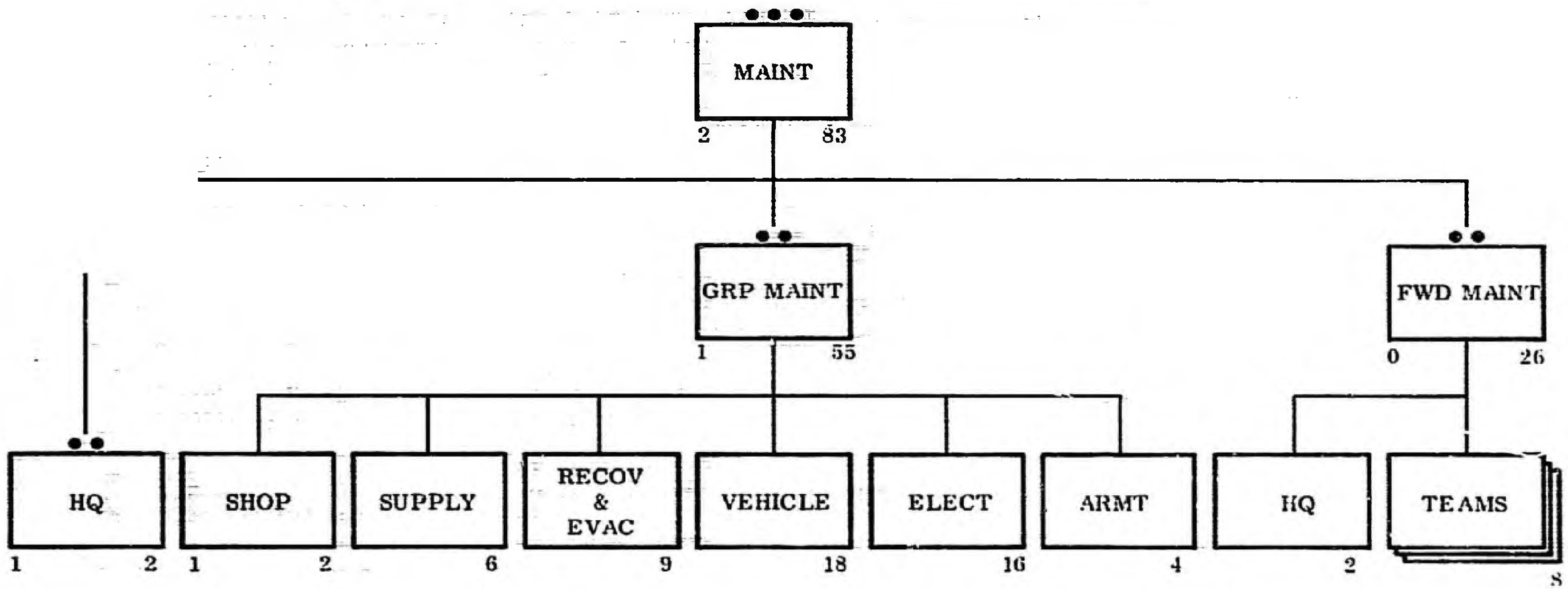
PERS	1 Commanding Officer 1 Executive Officer 1 1st Sergeant	1 Supply Sergeant 1 Clerk/Driver 1 Driver/Radio Operator
VEH	2 Truck Utility 1/4-T 2 Trailer Cargo 1/4-T	
COMM	1 AN/VRQ 3 1 AN/VRC 10 1 Radio Set AN/GRR 5	

MESSAGE CENTER ELEMENT, HQ & MSG CENTER
SERVICE CO, ICG



PERSONNEL	1 Message Center Officer 1 Sig Message Supervisor 1 Comm Center Specialist 1 Senior Motor Messenger	2 Teletype Operator 2 Comm Clerk 3 Motor Messenger 1 Assistant Motor Msgr
VEHICLES	1 Trailer, Cargo, 1/4-T 1 Truck, Cargo, 2 1/2-T, LWB 3 Truck, Utility, 1/4-T 1 Generator, Set gas engine, trailer mounted	
COMM	1 Radio Set, AN/VRC 10	

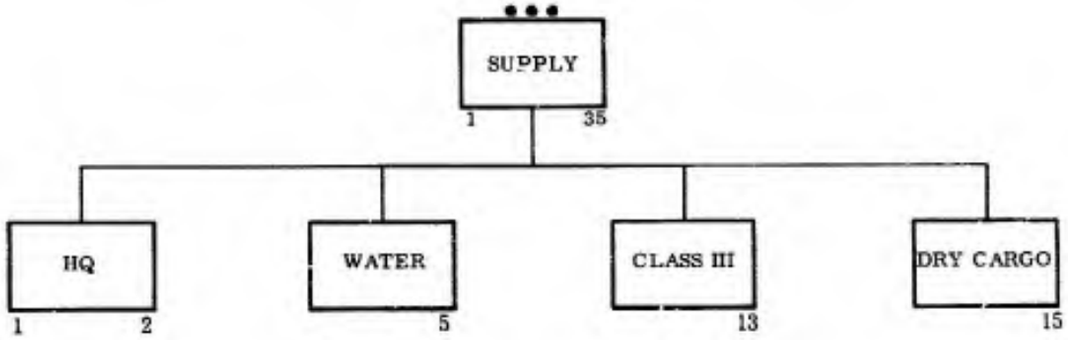
MAINTENANCE PLATOON, SERVICE COMPANY, ICG



PERSONNEL	1 Maint Officer 1 Maint NCO 1 Driver/ Radio Operator	1 Asst Maint Officer 1 Maint NCO 1 Clerk	1 Supply Sgt 2 Supply Clk 3 Part Spc/ Driver	1 Sect Sgt 4 Auto Mech 4 Recov Veh Operator	1 Sect Chief 4 Sr Veh Rpmn 8 Veh Mech 3 Eng Rpmn 2 Mech Hlpr Driver	1 Sr Radio Rpmn 10 SP Elect 5 Radio Rpmn	1 Sr Arty Rpmn 1 Arty Rpmn 1 Trt Arty Rpmn 1 Instr Rpmn	1 Maint Sect Chief 1 Driver/Rad Operator	1 Sr Veh Mech 3 Veh Mech 1 Armor Driver 3 Radio Rpmn
VEHICLES	1 Trk 1/4-T 1 Tlr 1/4-T	*1 Trk 2 1/2-T 1 Tlr 1 1/2-T 1 Trk 1/4-T 1 Tlr 1/4-T 1 Trk 3/4-T	*3 Trk 2 1/2-T 2 Tlr 1 1/2-T 1 Tlr Water 400 Gal	4 Tank (M-48)	2 ASV Trk, 2 1/2-T 1 Trk Med Wrkr (M-62) 2 Tlr 1 1/2-T	1 Trk 2 1/2-T 3 Trk 1/4-T 1 Tlr 1/4-T 2 Trk 3/4-T	* 1 Trk 2 1/2 -T	1 Trk 1/4-T	* 1 Trk 2 1/2 -T 1 Tlr 1 1/2-T
COMM	1 AN/VRC 10 1 AN/GRC 19	1 VRC 10		4 VRC 15				1 VRC 22	1 VRC 22

* M-59 (APC) were in short supply and 2 1/2-T truck was substituted for same.

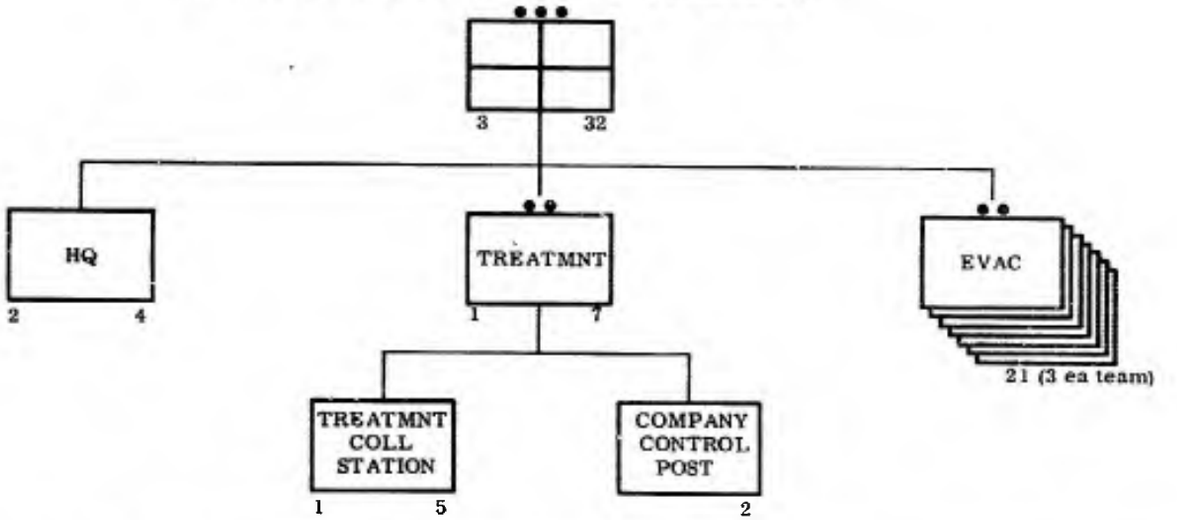
SUPPLY PLATOON, SERVICE COMPANY, ICG



PERS	1 Platoon Leader 1 Platoon Sergeant 1 Driver	1 Section Sergeant 2 Driver 2 Water Purifying Unit Operator	1 Section Sergeant 2 Squad Leader 10 Driver	1 Section Sergeant 2 Squad Leader 2 Forklift Operator 10 Driver
VEH	1 Truck, 1/4-T 1 Trailer, 1/4-T	2 Truck, 2 1/2-T 2 Trailer, Water, 400 Gal	* 10 Truck, 2 1/2-T * 10 Trailer, 1 1/2-T	10 Truck, 2 1/2-T *10 Trailer, 1 1/2-T
SP EQUIP		2 Unit WPU 1500 GPH + 2 Container, Water, 500 Gal, seal bin	**10 RFT 500 Gal **10 Container POL 500 Gal, seal bin (4-1000 Gal RLT ILO 10 RLT 500 Gal).	++ 2 Forklift 6000# Rough Terrain
COMM	1 VRQ 3	2 VR[illegible]	10 VRC 22	10 VRC 22

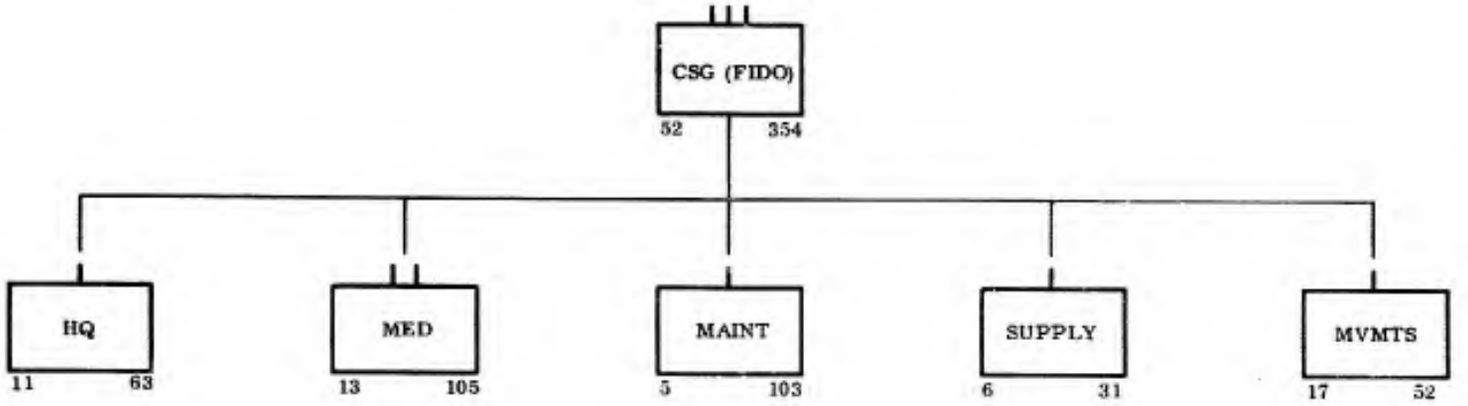
* Not used
** Not received; 6 Truck 2 1/2-[illegible] POL 1200 Gal issued instead
\+ Received during final 2 week[illegible] of experiment
++ Received during final 2 wee[illegible]s; items issued were not rough-terrain model

MEDICAL PLATOON, SERVICE COMPANY, ICG



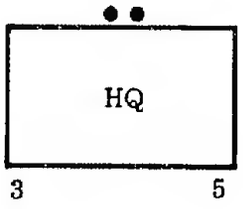
PERSONNEL	1 Platoon Leader 1 Asst Platoon Ldr 1 Platoon Sergeant 2 Radio Operator/Driver 1 Radio Operator	1 General Medical Officer 1 Section Sergeant 1 Senior Aid Man 2 Medical Aid Men 1 Radio Operator/Driver	1 Senior Aid Man 1 Sr Aid Man Dvr/Rad Operator	7 Driver APC 14 Aid Men/Radio Operator
VEH	1 Truck, 1/4-T 1 Truck, 3/4-T 1 Tlr, 1/4-T	1 Truck, 3/4-T	1 Truck, 1/4-T	7 APC M-59 (Ambulance)
COMM	1 Set, Radio, AN/VRC 9 1 Set, Radio, AN/VRQ 2 1 Set, Radio, AN/GRC 19	1 Set, Radio, AN/VRC 9 1 Set, Radio, AN/VRQ 2	1 Set, Radio, AN/VRC 9 1 Set, Radio, AN/VRC 2	7 Set, Radio, AN/VRC 9 7 Set, Radio, AN PRC 9

COMPOSITE SUPPORT GROUP



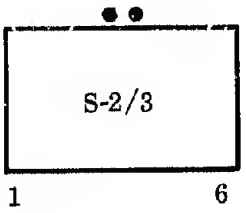
VEHICLES	37 Truck 1/4-T 29 Truck 3/4-T 33 Truck 2 1/2-T Cargo 10 Truck 3/4-T Amb	3 Truck 2 1/2-T Pol 1200 Gal 1 Truck Cargo 5-T M54 9 Tractor 5-T M52 2 Truck Trac M26 2 Trailer M15	2 Wrecker 5-T M62 9 Semi-Tlr M127 6 Semi-Tlr M131 Pol 5000 Gal 1 Van Commo V83 5 Trailer 1/4-T 3 Trailer 3/4-T	2 Trailer 1 1/2-T 2 Trailer Water 400 Gal 3 Helicopter H21 4 Aircraft J1A 3 Helicopter H19 1 Helicopter H13
COMM	3 AN/GRR 5 3 AN/GRC 9 16 AN/GRC 19	5 AN/VRQ 2 2 AN/GRC 46 23 AN/VRC 17	16 AN/VRC 9 1 Swbd SB 86-P 1 Swbd TP SB 22/PT	34 Telephone TA 312/P 1 Commo Equip AEPG 1 Gen Set PU/294/G
SPEC EQUIP	2 Forklift 6000# 2 WPU 1500 Gal 4 RLT 1000 Gal			

COMMAND HEADQUARTERS, CSG



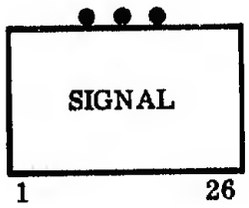
PERS	1 Commanding Officer 1 Executive Officer 1 Adjutant	1 Sgt Major 1 Clerk/Typist 3 Rad Opr/Dvr
EQUIP	1 Radio Set AN/GRR 5 2 Radio Set AN/GRC 9 2 Truck Cargo 1/4-T	1 Truck Cargo 3/4-T 1 Helicopter H-13 2 Set Radio AN/VRQ 2

S-2/3 SECTION, HEADQUARTERS, CSG



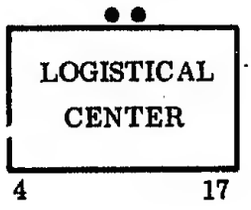
PERS	1 Intel Opn Off 1 Opn Sgt 1 Intel Sgt	2 Clerk/Typist 1 Draftsman/Dvr 1 Dvr/Rad Opr
EQUIP	1 Set, Radio, AN/GRC 19 1 Set, Radio, AN/VRQ 2	1 Set, Radio, AN/GRR 5 2 Truck, Cargo 3/4-T

SIGNAL PLATOON, CSG



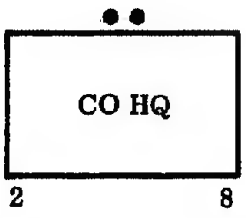
PERSONNEL	1 Signal Officer 1 Comm Chief 1 Op Sgt/MC 3 R/TT Chief 7 R/TT Opr	3 TP Switchboard Opr 2 Wireman/Dvr 1 Comm Clerk/Dvr 6 Motor Messenger 1 Wire Foreman 1 Power Gen Rpmn
EQUIPMENT	5 Truck Cargo 1/4-T 5 Truck Cargo 3/4-T 1 Van Comm V-83 2 Set, Radio AN/GRC 46 1 Switchboard SB-86P	21 Telephone TA 312/P 1 Gen Set, gas, Eng Tlr Mtd PU/294/G 1 Comm Equip AEPG 1 Radio Set AN/GRC 9 1 Radio Set AN/VRQ 2

LOGISTICAL CENTER, HEADQUARTERS CSG



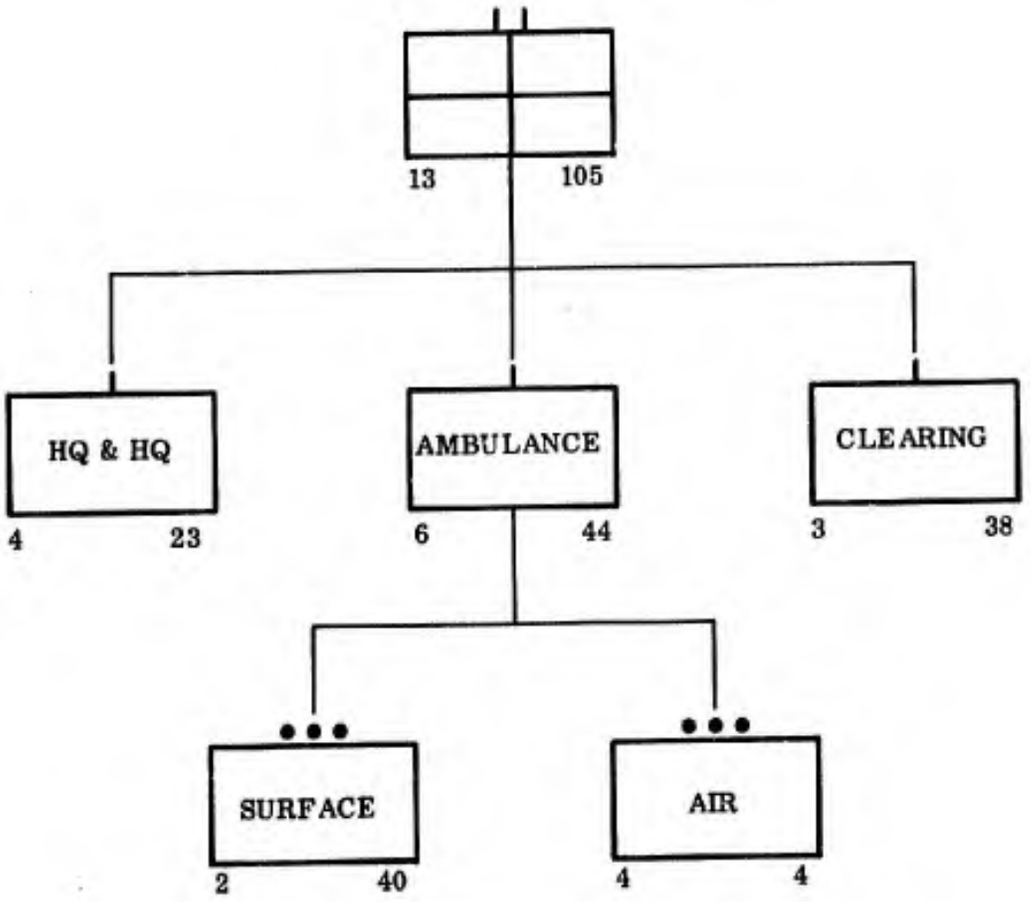
PERSONNEL	1 Logistical Officer 1 Ordnance Officer 1 Supply Officer 1 Movement Officer	1 Logistical NCO 1 Sr Sup SP 1 Supply SP 1 Trans SP 1 Ordnance Parts SP 6 Clerk/Typist 6 Driver
EQUIP	6 Truck, Cargo 1/4-T 4x4 1 Truck, Cargo 3/4-T 4x4	6 Set, Radio, AN/GRC 19 6 Set, Radio, AN/VRC 9

COMPANY HEADQUARTERS, CSG

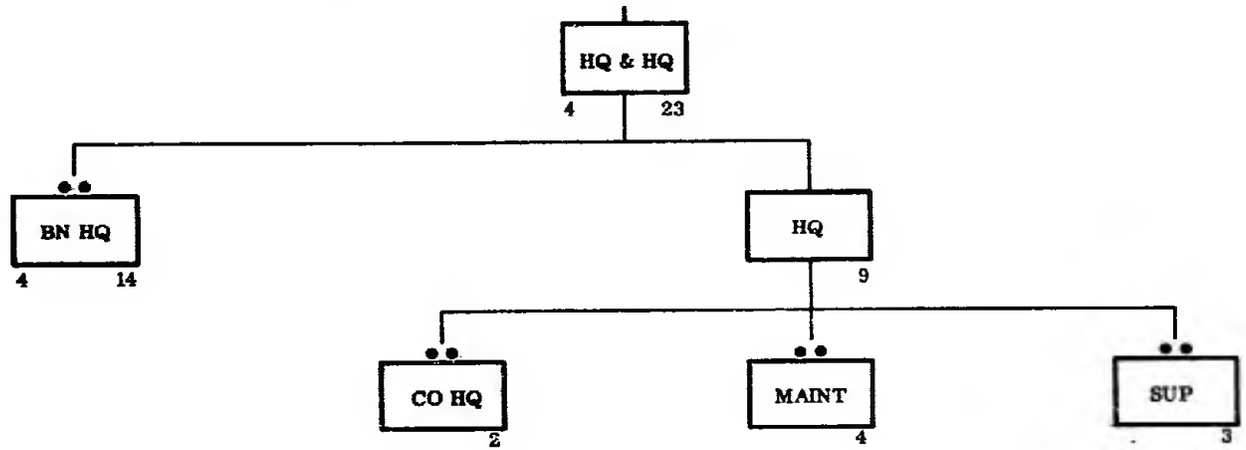


PERSONNEL	1 Commanding Officer 1 Executive Officer 1 1st Sgt 1 Sup Sgt 1 Co Clk/Dvr	1 Clk/Typist 1 Dispatcher 1 Mailman/Dvr 1 Sup Clk/Dvr 1 Dvr/Rad Opr
EQUIP	2 Truck 1/4-T 1 Truck 3/4-T 1 Truck 2 1/2-T Cargo	1 Set Radio AN/VRC 9 1 Set Radio AN/GRR 5

MEDICAL BATTALION, CSG

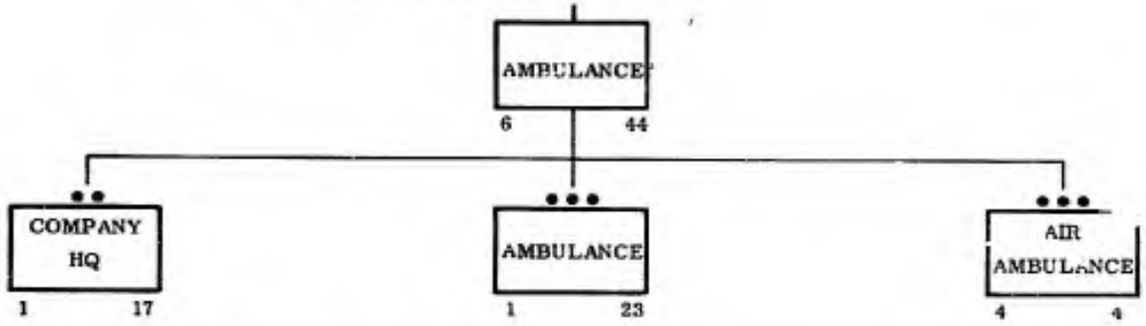


HQ & HQ COMPANY
MEDICAL BATTALION, CSG



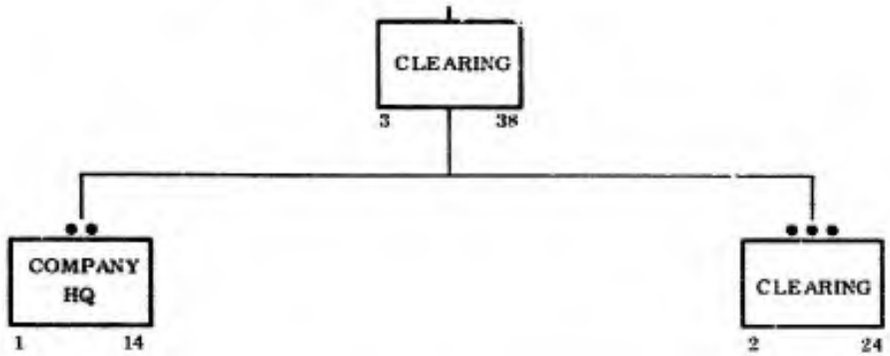
PERSONNEL	1 Battalion CO 1 Executive Officer 1 Adjutant 1 Supply Officer 1 Operations Sergeant 1 Personnel Sergeant 1 Comm Chief 3 Switchboard Operator 2 Clerk/Typist 4 Radio Operator/Driver 1 Driver 1 Radio Operator	1 Company Clerk 1 Radio Operator/Driver	1 Motor Sergeant 2 Wheel Vehicle Mechanic 1 Mechanic Helper	1 Medical Supply Sergeant 1 Supply Clerk 1 Supply Clerk/Driver
VEH	3 Truck, 1/4-T 2 Truck, 3/4-T	1 Truck, 3/4-T 1 Trailer, 1-T	1 Truck 3/4-T	1 Truck, 2 1/2-T 1 Trailer, 1 1/2-T
COMM	1 AN/VRQ 1 1 AN/VRQ 3 1 AN/VRQ 22 2 AN/VRQ 10 1 AN/GRR 5 1 AN/GRC 19			

AMBULANCE COMPANY
MEDICAL BATTALION, CSG



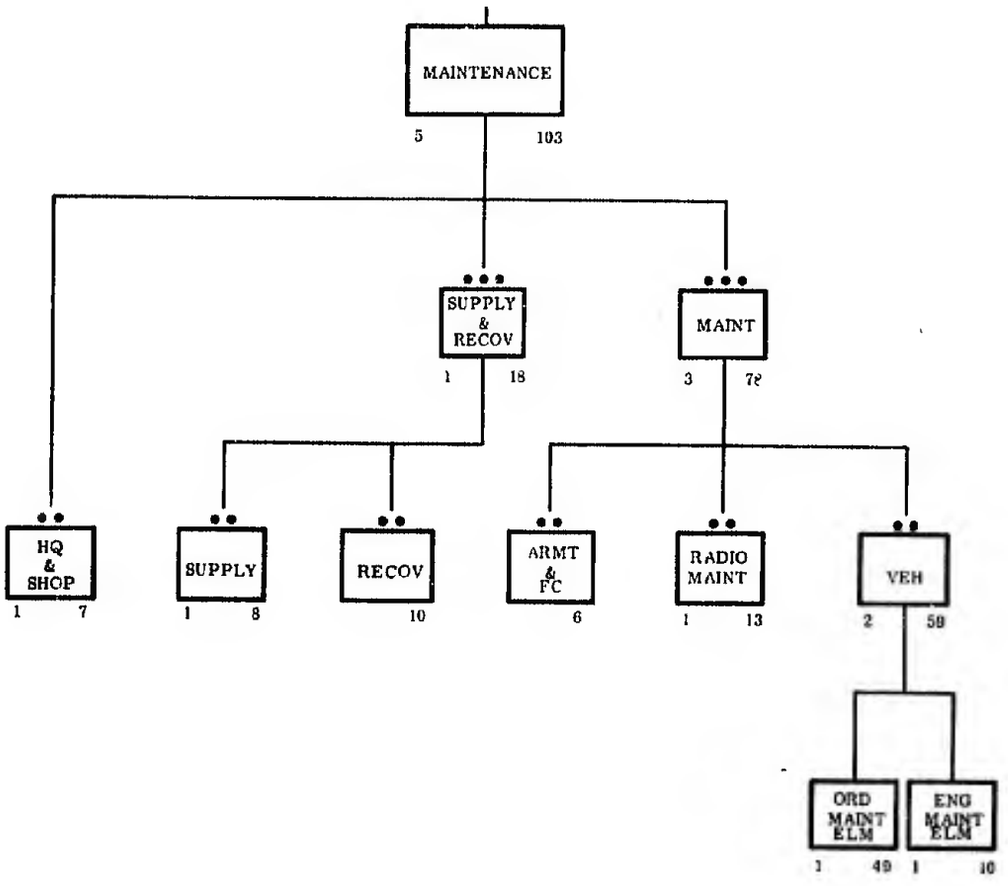
PERSONNEL	1 Commanding Officer 1 1st Sergeant 1 Supply Sergeant 1 Motor Sergeant 1 Hcptr Maintenance Supervisor 3 Helicopter Crew Ch 1 Helicopter Mechanic 4 Wheel Vehicle Mechanic 1 Radio Mechanic 1 Driver/Radio Operator 2 Hcptr Mech Helper 1 Co Clk	1 Platoon Leader 1 Platoon Sergeant 1 Asst Platoon Sergeant 1 Driver/Radio Operator 10 Ambulance Driver 10 Ambulance Orderly	1 Platoon Leader 3 Medical Evacuation Pilot 1 Driver/Radio Operator 3 Senior Medical Aid Men
VEHICLES	2 Truck 3/4-T 1 Truck 2 1/2-T 1 Truck 2 1/2-T (POL) 2 Truck 1/4-T 2 Trailer 1/4-T 1 Trailer 1 1/2-T Cargo 1 Trailer (Water)	1 Truck 1/4-T 10 Truck 3/4-T Ambulance 1 Trailer 1/4-T	3 Helicopter Utility H-19 1 Truck 1/4-T 1 Trailer 1/4-T
COMM	1 AN/VRC 10 1 AN/GRR 5	2 AN/BRC 10	3 AN/ARC 44 1 AN/GRR 5 1 AN/VRC 10

CLEARING COMPANY
MEDICAL BATTALION, CSG



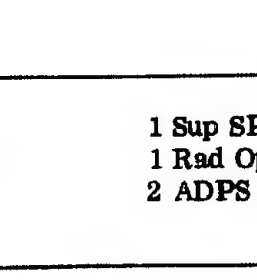
PERSONNEL	1 Command Officer 1 1st Sergeant 1 Supply Sergeant 1 Company Clerk 1 Radio Operator/Driver 1 Medical Supply Clerk 1 Mess Sergeant 4 First Cooks 3 Cooks 1 Cooks Helper	1 Platoon Leader 1 Assistant Platoon Leader 1 Platoon Sergeant 2 Section Sergeant 1 Medical Laboratory Specialist 1 Pharmacy Specialist 6 Medical Aid Men 2 Receiving/Forwarding Clerk 10 Aid Station Attendant 1 Radio Operator/Driver
VEHICLES	1 Truck 2 1/2-T 1 Truck, 1/4-T 4x4 1 Truck, 3/4-T 4x4 1 Trailer, 1/4-T 1 Trailer, 1-T	1 Truck 1/4-T 1 Trailer 1/4-T 3 Truck 2 1/2-T 2 Trailer, 1 1/2-T 1 Trailer, Water
COMM	1 AN/GRR 5 1 AN/VRC 10	1 AN/VRC 10

MAINTENANCE COMPANY, CSG



PERSONNEL	1 Shop Off 1 Opn Sgt 1 Sup Sgt 2 Shop Clk 1 Dvr/Radio Opr 1 Dispatcher 1 Messenger	1 Supply Off 1 Sec Chief 1 Ord Prt SP 2 Stk Rec Clk 1 Sig Prt SP 1 Eng Prt SP 2 Sup Handler	1 Sec Chief 4 Dvr/Opr ? Wrecker Opr 3 Veh Crewmen	1 Sec Chief 1 Arty Rpmn 1 Trt Arty Rpmn 1 Inst Rpmn 1 S A Rpmn 1 LAAA FC	1 Maint Off 1 Loc Coord 1 Inspector 5 Sv Rad Rpmn 6 Radio Rpmn	2 Maint Off 3 Inspectors 40 Auto Rpmn 1 Metal Body Rpmn 2 F & E Rpmn 2 Welder 1 Tool-Keeper 10 Eng Rpmn
VEHICLES	2 Trk 1/4-T 1 Trk 2 1/2-T (SV) 1 Trk 2 1/2-T (C) 1 Tlr 1/4-T	1 Trk 1/4-T 2 Trk 3/4-T 5 Trk 2 1/2-T 1 Tlr 1/4-T 5 Tlr 1 1/2-T 1 Tlr, Water, 400 Gal	2 Trk Trac (M26) 1 Trk 1/4-T 1 Wrecker 5-T (M62) 2 Trailer (M15)	1 Trk 1/4-T 2 Trk 2 1/2-T(SV) 1 Trk 2 1/2-T	1 Trk 1/4-T 2 Trk 2 1/2-T (SV)	1 Trk 1/4-T 6 Trk 2 1/2-T (C) 2 Trk 2 1/2-T (SV) 6 Trk 3/4-T 5 Tlr 1 1/2-T 1 Tlr 1/4-T
COMM	1 AN/GRC 19 1 AN/GRC 9	1 AN/GRC 9	3 AN/GRC 9			1 AN/GRC 19 5 AN/GRC 9

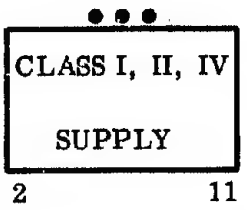
HEADQUARTERS PLATOON
SUPPLY COMPANY, CSG



PERS	1 Supply Officer 1 Asst Supply Officer 1 Sr Supply SP	1 Sup SP 1 Rad Opr/Dvr 2 ADPS Clerk
EQUIP	1 Set, Telephone TA-312/PT 1 Set, radio AN/VRQ-2 1 Set, radio AN/GRC 19 1 Truck, cargo, 3/4-T	

CLASS I, II, IV SUPPLY PLATOON

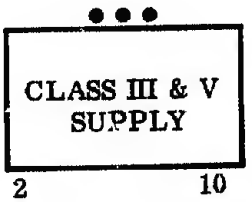
SUPPLY COMPANY, CSG



PERS	1 Supply Officer 1 Asst Supply Officer 1 Sr Supply SP	1 Driver/ Radio Opr 4 Forklift Operator 5 Supply Handler
EQUIPMENT	1 Hand Truck, 2 wheel 25 Pallets 2-way 25 Pallets 4-way 20 Roller Conveyor Wh Gravity, Aluminum, 4' 2 Unit Water Purification, Tlr Mtd 1500 Gal	2 Telephone Set, TA-312/PT 1 Set, Radio AN/VRC 9 1 Truck, Cargo 1/4-T 4x4 1 Truck, Cargo 2 1/2-T 6x6 1 Trailer, Water, 400 Gal 2 Forklift, 6000# cap

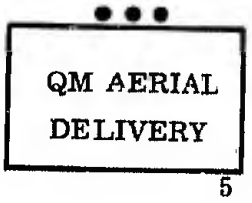
CLASS III & V SUPPLY PLATOON

SUPPLY COMPANY, CSG



PERS	1 Supply Officer 1 Asst Supply Officer 1 Sr Supply SP	2 Supply SP 1 Driver/Radio Op 6 Supply Handler
EQUIP	1 Set, Telephone TA-312/PT 1 Set, Radio AN/VRC 9 1 Truck, Cargo 3/4-T 4x4 1 Truck, Cargo 2 1/2-T 6x6	

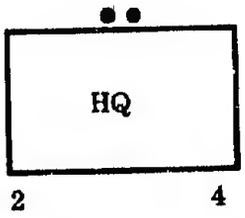
QM AERIAL DELIVERY PLATOON
SUPPLY COMPANY, CSG



PERS	1 QM Aerial Del SP 4 Parachute Riggers
EQUIP	1 Truck Cargo 2 1/2-T 1 AN/VRC 9

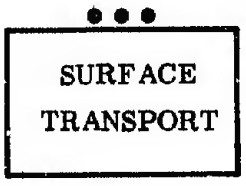
HEADQUARTERS SECTION

MOVEMENTS COMPANY, CSG



PERS	1 Commanding Officer 1 Maintenance Officer	1 1st Sgt 1 Radio Opr 2 Driver
EQUIPMENT	1 Switchboard, Telephone, Manual SB-22/PT 2 Telephone Set, TA-312/PT 2 Trailer, Cargo 1/4-T, 2 Wh, M-100 1 Trailer, Tank, Water, 1 1/4 -T, 2 Wh, 400 Gal, M106A1, Compl	1 Truck, Cargo 2 1/2-T 6x6 2 Truck, Utility 1/4-T, 4x4 2 Radio Set, AN/VRC 17 (1 per veh) 1 Radio Set, AN/GRC 19

SURFACE TRANSPORT PLATOON
MOVEMENTS COMPANY, CSG



PERSONNEL	1 Platoon Leader 1 Platoon Sgt 1 Maint Sgt 1 Section Leader	2 Squad Leader 3 Wheel Veh Mechanic 16 Driver 1 Dispatcher
EQUIPMENT	4 Rolling Fluid Transporter 1000 Gal 9 Semi-Trailer S&P 12-T M127 6 Semi-Trailer Tank Gasoline 5000 Gal M131 4 Telephone Set TA-312/PT 1 Trailer Cargo 1/4-T M100 2 Trailer Cargo 3/4-T M101	2 Truck Cargo 3/4-T 1 Truck, Cargo 5-T M54 9 Truck Tractor 5-T M52 1 Truck Utility 1/4-T 1 Truck Wrecker Med 5-T M62 14 AN/VRC 17 48 Conveyor, Wheel Gravity, Aluminum 4' straight 3 Conveyor, Wheel Gravity, Aluminum 10' straight

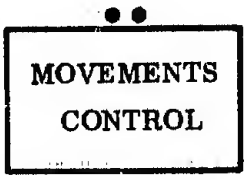
AIR TRANSPORT PLATOON

MOVEMENTS COMPANY, CSG

PERSONNEL	1 Platoon Leader 12 Pilots 1 Platoon Sgt 5 Crew Chief	6 Mechanic Helper 1 Dvr/Radio Operator 2 Airfield Controller 1 Dispatcher 3 Driver
EQUIPMENT	1 Aircraft L-20 3 Aircraft U1A 3 Helicopter H-21 3 Telephone Kit, TA-312/PT 2 Trailer Basic Utility 2 1/2-T 1 Trailer Cargo 1/4-T M100	1 Trailer Cargo 3/4-T M101 1 Trailer Cargo 1 1/2-T M104A1 1 Truck Cargo 2 1/2-T 2 Truck Tank Gasoline M49C 1 Truck Utility 1/4-T 5 Radio Set AN/VRC 17

MOVEMENTS CONTROL SECTION

MOVEMENTS COMPANY, CSG



PERS	1 Operations Officer 1 Operations Sgt 2 Driver/ Radio Opr	
EQUIPMENT	1 Radio Set AN/GRC 19 2 Radio Set AN/VRC 17 4 Telephone Set TA/312 PT	1 Trailer Cargo 1/4-T M-100 1 Trailer Cargo 1 1/2-T. M104A1/M105A1 1 Truck Cargo 2 1/2-T 1 Truck Utility 1/4-T

APPENDIX 2

SAMPLE MEDICAL SCENARIO

1. PURPOSE: This scenario covers the events to occur during practice runs of Task Nr 2 - Medical service in support of an ICG in the attack.

2. GENERAL SITUATION:

a. Maps. Road Map of California, 1:1,500,000

California, 1:25,000

COSIO KNOB	1756 II SW
JOLON	1755 I NW
BURNETT PEAK	1755 I SW

b. Enemy Situation.

(1) Aggressor has seized and occupies the high ground E and SW of HUNTER LIGGETT MILITARY RESERVATION from (5986) (6086) to (5784) (5686).

(2) Intelligence reports indicate that Aggressor is planning to defend the HLMR area. Aggressor elements have been reported in the vicinity of KING CITY (6808).

c. Friendly situation.

(1) 1st MOMAR Division attacks to the NW; axis of advance -- (759778), (697787), (644818), (602836).

(2) 1st ICG seizes high ground E of HLMR (5986) to (6086).

(3) Co A, 1st ICG, establishes road blocks at (624855), (614845), and (613842), protects right flank of ICG.

(4) Medical Battalion, CSG, supports 1st ICG with one platoon of Ambulance Company in direct support.

(5) Clearing Station located at CAMP ROBERTS (0562).

(6) FIDO Hospital at CAMP ROBERTS (0562).

3. STATUS OF CANDIDATE MEDICAL PLATOON:

a. Candidate medical platoon has been reconstituted and is at authorized strength.

b. Elements of the medical platoon that are not committed will participate in this task as observers.

c. Rotation and/or replacement of medical platoon players is authorized at discretion of ICG Surgeon.

4. DESCRIPTION OF TASK:

a. Medical service in the attack.

b. Task to be performed at Hunter Liggett Military Reservation, Medical Terrain Course Nr 1 and 2.

c. Detailed description.

(1) This task will be conducted during the three-week period 4 - 22 April.

(2) During each practice run the candidate platoon will be required to execute the following:

(a) Establish an ICG aid station in close support of the ICG.

(b) Establish one company collecting post in support of one combat company of three platoons.

(c) Establish a medical command communications net.

(d) Support the operation by battlefield search and recovery, emergency medical treatment, evacuation of casualties, and care and treatment during evacuation.

(e) Loading and unloading APC-ambulances.

(f) Preparation and loading casualties for air evacuation.

5. TASK SEQUENCE:

a. Assimilation of orders.

b. Conduct of reconnaissance.

c. Formulation of ICG medical plan.

d. Calculation and procurement of medical supplies.

e. Movement to mission site.

f. Organization for task.

g. Execution of mission.

h. Reorganization and/or termination of task.

6. EXECUTION and CONTROLLER ACTION:

a. Method of initiating action.

(1) When directed by chief logistical controller, medical controller will present the ICG S-4 with extracts of the Division and ICG Operations Orders Nr 2.

(2) Upon completion of steps a through e above, the medical controller will pre-position casualties on the ground in Medical Terrain Course Nr 1 and 2, according to overlays prepared by project team medical representative.

(3) Medical platoon controllers will initiate the action in each of the platoon areas by sending the following message to the platoon CP: "This is the first squad leader. I have a casualty at coordinates (_____)." A brief description of the nature of the wound or injury will be given.

(4) The tactical platoon leader will issue necessary orders to the platoon aidmen to initiate the search for and treatment of the casualty.

(5) The actions and orders of the candidate medical platoon will follow the "free play" concept of operations.

b. Method of controlling action.

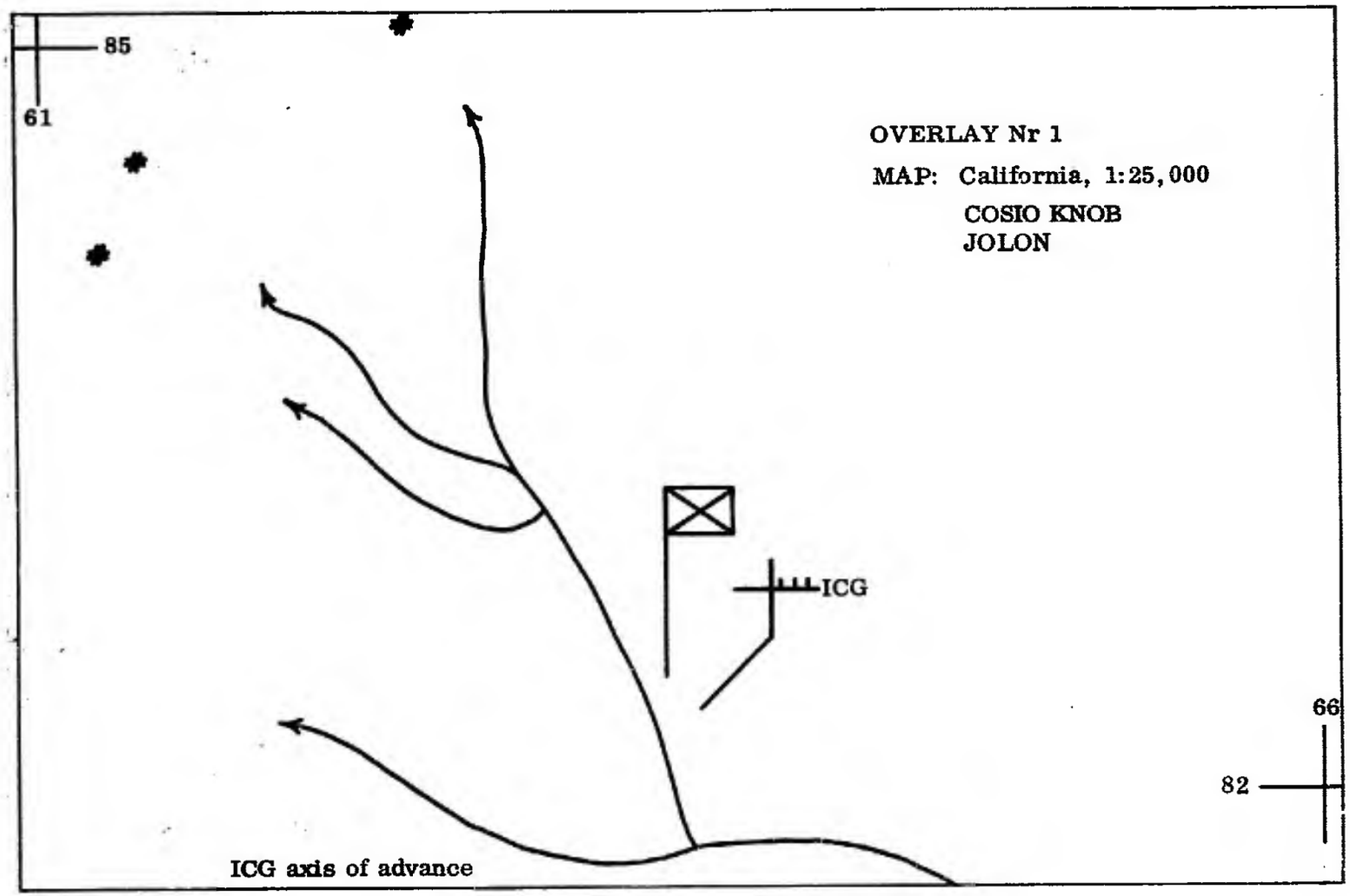
(1) Controllers will be assigned to each platoon aidman, senior company aidman, AMB-ambulance driver, and to the ICG medical platoon leader.

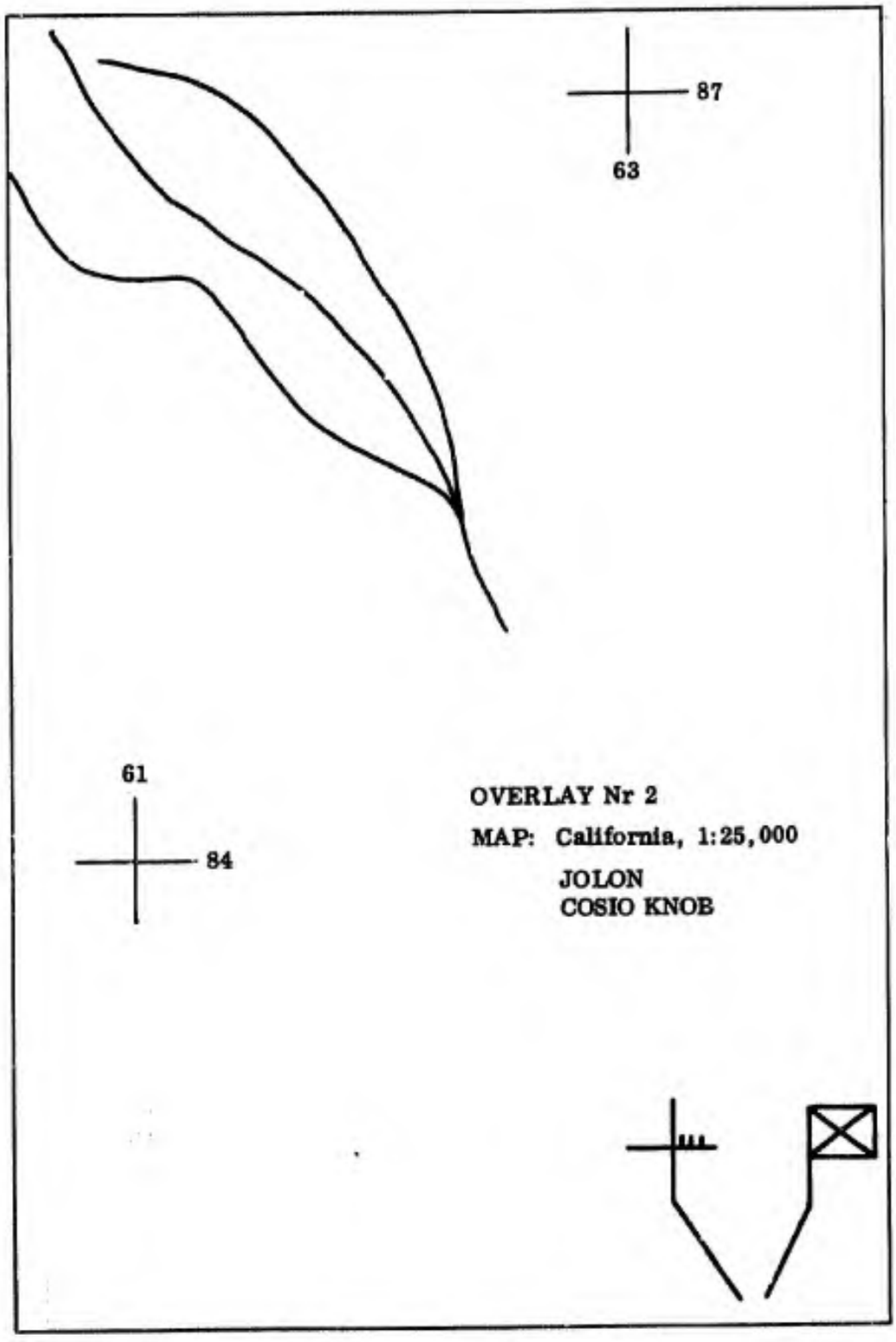
(2) Controllers will assess casualties and initiate messages according to information written on each casualty assessment record prepared by chief medical controller.

7. STATEMENT OF SUBSEQUENT TASKS:

a. Candidate medical platoon will be given extracts of Division and ICG Operations Order Nr 3, directing his platoon to participate in continued field operations.

b. Task Nr 3 will be an examination of medical service in support of an ICG in an exploitation mission.





MEDICAL CASUALTY PLACEMENT SCHEDULE

Tuesday, 3 May - 80 Casualties

PLT.	TIME	NO. CASUALTIES	CDEC COORD.	TAG NOS.
1st	0900	4	ON RD	01509 01510 01511 01512
	0920	4	ON RE	01513 01514 01515 01516
	0940	4	ON RG	01507 01508 01504 01505
	0955	4	ON RH	01506 01499 01500 01501
2nd	0905	4	OP WE	01502 01503 01496 01498
	0925	4	OP WH	01497 00877 01035 01273
	0945	4	OP WJ	00298 01352 00623 00622
	1000	4	OP WS	00023 00046 00436 00080

Tuesday, 3 May - 80 Casualties (Continued)

PLT.	TIME	NO. CASUALTIES	CDEC COORD.	TAG NOS.
3rd	0900	4	PQ WS	00131 00356 00495 00163
	0920	4	PQ WX	00377 00595 00416 00184
	0940	4	PQ WW	00133 00340 01140 01114
	1000	4	PQ WJ	01039 01319 00096 00741
4th	0900	4	PP YX	01138 00399 00220 00460
	0920	4	PP YS	00961 01027 01254 01357
	0940	4	PP YN	00780 00279 00541 00823
	1000	4	PP YJ	01492 00875 00822 00769

Tuesday, 3 May - 80 Casualties (Continued)

PLT.	TIME	NO. CASUALTIES	CDEC COORD.	TAG NOS.
5th	0900	4	PO BA	00663 01297 01115 01234
	0920	4	PO BH	00580 00543 00662 00813

REAR AREA CASUALTIES

0940	4	PO YC	00962 01146 01041 00633
1000	4	PO YD	00201 00746 00679 01179

APPENDIX 3

SAMPLE AERIAL DELIVERY SCENARIO

Scenarios activating the requirements for para-dropped supplies were prepared by the Logistical Officer, Project Team. Messages were forwarded to addressee by messenger or electrical means. Messages were essentially as shown hereon.

NO. 5 4 MAY 1960

TO: S-4, 1ST I.C.G.

SURFACE RESUPPLY ROUTE TO MOMAR CLOSED. PARADROP SUPPLIES. ETA OVER DZ 04 1430 MAY. MAP REF 1755 1 NW. DROP ZONE NR 5. ORD. CL V8 71 8X 76MM TANK GUN AMMO. UTILIZE 3 AIRCRAFT U1A. FORMATION AIRCRAFT IN LINE. EACH AIRCRAFT MAKE 2 PASSES OVER DZ. DISPLAY 2 ADDITIONAL PANELS IN DZ LAID OUT 100 YDS APART MEASURED.

WEINFIELD, CO 0710
/s/ JOHN H. PEPPERDENE, MAJ.

A Flight SOP (TAB 1) and overlays of Drop Zones (TAB 2) were prepared and issued to all units concerned. The Flight SOP contained the following specific information essential for para-drops only.

FLIGHT SOP

a. Approach DZ from Bradley Pass

b. Coordinates of DZ

c. Altitude over DZ - 100 feet

d. Air speed over DZ - 90 knots

e. Turns will be upwind. Panels indicate wind direction and center of DZ

f. Drops should strike as close to panel display as possible, make drops on turn

g. Maximum number of bundles dropped per pass 2.

h. When employing H-21 as cargo carrier, discharge cargo from rear door

i. Air-ground radio communication frequency - 44.1

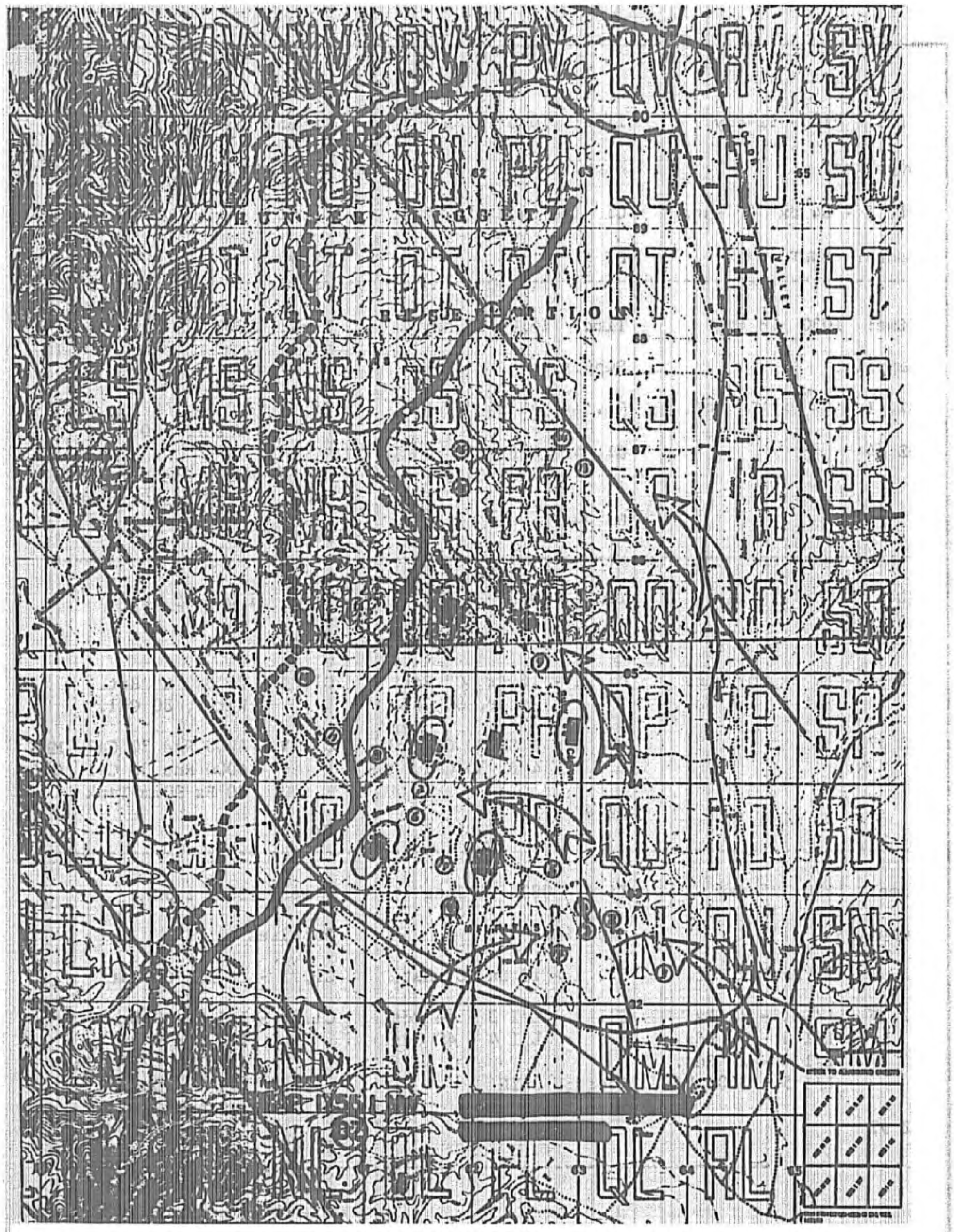
j. Radio Location Beam - Ground Control Guidance System Frequency - 36.2

k. All weapon simulators will be transported except blasting caps

l. Red railroad fusees mark center sector of DZ in night operations

m. Aircraft after drop proceed to SAFE altitude. (This applies to night drops only)

DROP ZONES



AERIAL DELIVERY SCHEDULE (EXCERPT)

Time: 2100 11 May Supplies Cl. I - 64 Bx "C" Rat. Coord: QNWT	Time: 1000 17 May Supplies Cl. I - 64 Bx "C" Rat. DZ #1	Time: 1530 17 May Supplies Cl. I - 64 Bx "C" Rat. DZ #3
Time: 1030 18 May Supplies Cl. I - 64 Bx "C" Rat. DZ #4	Time: 1410 18 May Supplies Cl. I - 48 Bx "C" Rat. Cl. V - 4 Bx MLB 7 Bx Clip DZ #4	Time: 1000 19 May Supplies Cl. I - 40 Bx "C" Rat. Water, 160 Gal. Cl. V - 5376 Rds MLB 30 Cal. 5250 Rds Clip 30 Cal. DZ #5
Time: 1400 19 May Supplies Cl. I - 32 Bx "C" Rat. Water, 160 Gal. DZ #7	Time: 1000 24 May Supplies Cl. I - 16 Bx "C" Rat. Water, 80 Gal. Cl. V - 6 Bx 30 Cal. clip 4 Bx 30 Cal. MLB DZ #2	Time: 1000 25 May Supplies Cl. I - 20 Bx "C" Rat. Water, 80 Gal. Cl. V - 4000 Rds 30 Cal. MLB 4000 Rds 30 Cal. Clip 20 Bx 90mm Tank DZ #8
Time: 1400 25 May Supplies Cl. I - 12 Bx "C" Rat. Cl. V - L/I 1 - 12 Bx. L/I 3 - 40 Rds. L/I 4 - 24 Rds. L/I 5 - 3600 Rds. DZ #7	Time: 0830 1 June Supplies Cl. I - 12 Bx "C" Rat. Cl. V - L/I 3 - 64 Rds. L/I 4 - 40 Rds. Coord: OOYN	Time: 1300 1 June Supplies Cl. I - 16 Bx "C" Rat. Cl. V - L/I 2 - 9 Bx. L/I 11- 9 Bx. L/I 7 - 1750 Rds. L/I 3 - 50 Rds. L/I 4 - 22 Rds. DZ #23

Annex B
Supply Data

This annex summarizes the data for the supply portion of ICG Phase III Logistical Experimentation, with particular reference to those data which are pertinent to the discussion of supply operations presented in Section II of this report. A more detailed record of the data of the supply experiment is preserved in the form of a Research Memorandum (RO-RM 5) on file at the US Army CDEC Research Office. The contents of the present annex are as follows:

1. TOTAL NUMBER OF SUPPLY REQUESTS

Table B-1 lists the total number of requests that were made by each of the supported tactical units, for both scheduled delivery and emergency deliveries. These figures are for the number of times that either the scheduled delivery was adjusted, or, if no adjustment was made, the complete scheduled amount was delivered. It is counted as a request when no message is relayed by the tactical unit with an adjustment, indicating that the regular scheduled amount is desired. The figures for the emergency requests are for those that were actual requests for items that were needed to continue the experiment, and do not include the planned emergency deliveries by air drop that were a part of the experimental plan.

TABLE B-1

NUMBER OF REQUESTS

Unit	Scheduled Resupply	Emergency Resupply
"A" Echelon	16	0
MOMAR	15	2
INFANA	16	1
Range Co	14	0
ICG Engr Plat	14	0
OCE Engr Plat	14	0
Service	18	0

2. TOTAL AMOUNT OF SUPPLIES REQUESTED

The total amount of supplies requested during the experiment, both by scheduled requests and for emergency requests, for each supported unit is displayed in Tables B-2 and B-3. Table B-2 lists these total requirements that resulted from the scheduled deliveries and adjustments thereto. The amounts are listed by item for Class I, III, and V. Table B-3 lists the amounts requested for emergency delivery.

TABLE B-2
SUPPLIES REQUESTED BY SUBORDINATE ELEMENTS OF THE ICG

Class	Item	"A" Ech	MOMAR	INFANA	Range Co	ICG Engr Plat	OCE Engr Plat	Service
I	Rations (Indiv)	2965	2690	1404	1374	460	360	2052
III	Mo-Gas (gal)	23400	13000	18200	5850	900	600	22000
	OE #10 (qt)	366	240	252	12			96
	OE #30 (qt)	2745	1056	1080	60	12	12	952
	OE #50 (qt)	770	132	720			0	512
	OO #90 (gal)	31	45	35	10	1	1	10
	Grease GAA (lb)	140	45	35	10	5	5	5
	Brake Fld (gal)	6	9	8	2	1		6
	Solvent (gal)				15	5	5	711
	Hydra Fld (gal)					2		
	CW (lb)				10			
V*	AW (S) Cal .30 Blank (A) Rifle M-1	2304	14496					
	CONV (S) 106 RR Sim (A) 106 RR	70	520	520				
	GPMG (Cal .50 MG) (S) Cal .30 Blk Lnk (A) Cal .30 MG	11000	19250	65000				
	90 MM RR (S) 3.5" RL Sim (A) 3.5" RL		492	3025				
	120 MM RR (S) 106 MM Sim (A) 106 RR		440					
	LWIW (S) Cal .30 M-1 Blk (A) Rifle M-1		48768	44864				
	LWHHW (S) Cal .30 Blank (A) Rifle M-1	48080						
	76 MM Tank (S) Proj OB M115E (A) 76 MM	2000						
	90 MM Tank (S) Proj OB M115E (A) 90 MM			1690				

* Under each designated weapon is shown the actual weapon (A) used during the experiment and the simulator (S) used to represent the firing of that weapon.

TABLE B-3

EMERGENCY SUPPLIES REQUESTED

BY SUBORDINATE ELEMENTS OF THE ICG

Class	Item	MOMAR	INFANA
V	GPMG (Cal .50 MG) (S) Cal .30 Blk Lnk (A) Cal .30 MG	3500	0
	Cal .50 MG (S) Cal .30 Blk MLB (A) Cal .30 MG	0	5250

3. TOTAL AMOUNT OF SUPPLIES DELIVERED

Table B-4 lists for the entire experiment the total amount of supplies that were introduced into the supply system at the CSG in response to the requests summarized in Tables B-2 and B-3. It is not possible to correlate all of the requests with the list of items shipped. This is the result of the confusion that arises during experimentation from the use of simulators for the various weapons. Some simulators are used to simulate more than one weapon, and in some cases one weapon is simulated by more than one simulator. Because these simulators are not packaged to represent the weapon simulated, but are shipped in packs labeled with the nomenclature of the simulator, records often show the shipment of "Cal .30 Blank" or "M115". Because both of these simulators were used for the simulation of more than one weapon it is not possible to determine the breakdown between the various weapons. Table B-4 shows that 110,547 rounds of Cal .30 Blank were introduced in the system. These rounds were used to simulate either the AW, the LWIW, or the LWHHW, but there is no way of determining how many rounds for each weapon are represented. Also, there are 3,605 rounds of M115 listed. The M115 was used to simulate two different weapons, with differing weights and cubes for the actual rounds. In calculating weights and cubes in the following tables, the round with the greater weight and cube was used.

TABLE B-4

TOTAL SUPPLIES INTRODUCED BY CSG

ITEM	AMOUNT
Rations (individual)	6,810
Gasoline (gallons)	75,000
Water (gallons)	240
Oil (quarts)	7,860
Grease (pounds)	420
Solvent (gallons)	585
Hydr Brk Fld (gallons)	18
Cal .30 Rifle (rounds)	110,547
Cal .50 MG (rounds)	83,768
90mm RR (rounds)	2,067
81mm Mortar (rounds)	7,680
76mm (rounds)	2,198
106mm RR (rounds)	465
NAG (Conv) (rounds)	1,470
NAG (Nuo) (rounds)	46
90mm Tank (NBT) (rounds)	1,487
Primer M-57 (rounds)	465
M-115 (rounds)	3,605
Redeye (rounds)	3,015
Rifle Grenade (rounds)	157
120mm RR (HAW) (rounds)	384
LWILW (LWIW) (rounds)	4,000
LWHVW	11,516

4. TOTAL WEIGHT HAULED DURING THE EXPERIMENT

The following Table B-5 is a summary of the extension of the simulators hauled into the weights that they represented. That is, the table lists the amounts that would have been hauled during the experiment if real ammunition and rations had been carried. Figure B-1 is a schematic presentation of the flow of the supplies from the CSG to the ICG Service Company and from the ICG to the tactical units, showing the amounts moved between the support echelons, including the retrograde shipments. Examination of both the table and the figure will disclose that the totals moved between each echelon do not balance out. There are two basic reasons for this discrepancy. The first is the failure of the field data collectors to record properly all of the transfers and disbursements of supplies. The second is the problem of extending the weights and cubes of simulators that can represent two or three different weapons. If an M115E simulator is introduced into the supply system at the CSG as a 76mm round, but not properly marked, when that simulator is transfered or disbursed it might be recorded as a 76mm round, a 96mm round, an M115E, or anything else that the data recorder thinks that it is going to be used for. When the data collection forms are extended for weights and cubes the situation will then be one of having a different weight and cube on each form, for the same simulator. Attempts to balance weights and cubes shipped through the supply echelons under these conditions is extremely difficult, if not impossible.

Careful analysis and examination of the field forms indicates that the primary cause of imbalance in the figures is caused by this problem of simulator identification. Ignoring all designations, the total number of simulators shipped throughout the supply system has been carefully checked (Table B-6). These figures fall within a range of 1.7% of balancing at all echelons. Working from these figures, the weights and cubes have been calculated, assigning as best as possible the proper designation to the various simulators.

TABLE B-5

WEIGHTS OF ACTUAL SUPPLIES

AS EXTENSION OF SIMULATORS USED

AMOUNT SHIPPED BY CSG		
Air	265,000	
Ground	1,040,000	
Total	1,305,000	lbs
AMOUNT SHIPPED BY ICG		
Ground To Tactical Units	690,000	
Ground For Eng Range Co and Supply Co	246.000	
Total	936,000	lbs
AMOUNT RETROGRADED		
By Tactical Units	308,000	
By ICG	104,000	
Total	407,000	lbs
AMOUNT CONSUMED		
By Tactical Units	688,000	
By ICG (Supply Engineer and Range Co)	210,000	
Total	898,000	lbs
AMOUNT CONSUMED	898,000	
AMOUNT RETURNED	407,000	
Total	1,305,000	lbs

TABLE B-6

SUMMARY OF NUMBER OF UNITS HANDLED

BY SUPPLY SYSTEM, CLASS I & V

	Units Delivered By CSG To ICG		Units Delivered By ICG	Units Retrograded
	By Land	By Air	All By Land	All By Land
Week 1	78,422	742	50,150	3,424
2	41,029	769	41,261	45,512
3	49,367	5,646	36,622	14,830
4	42,159	25,256	19,035	34,550
5	26,692	62,075	30,074	19,195
6	36,382	0	78,825	1,145
Totals	274,051	94,483	255,967	118,656
	Total Introduced 368,539		Total Delivered Or Retrograded 374,623	

Units delivered or retrograded in excess of indicated total introduced in system: 6,084 or 1.7%

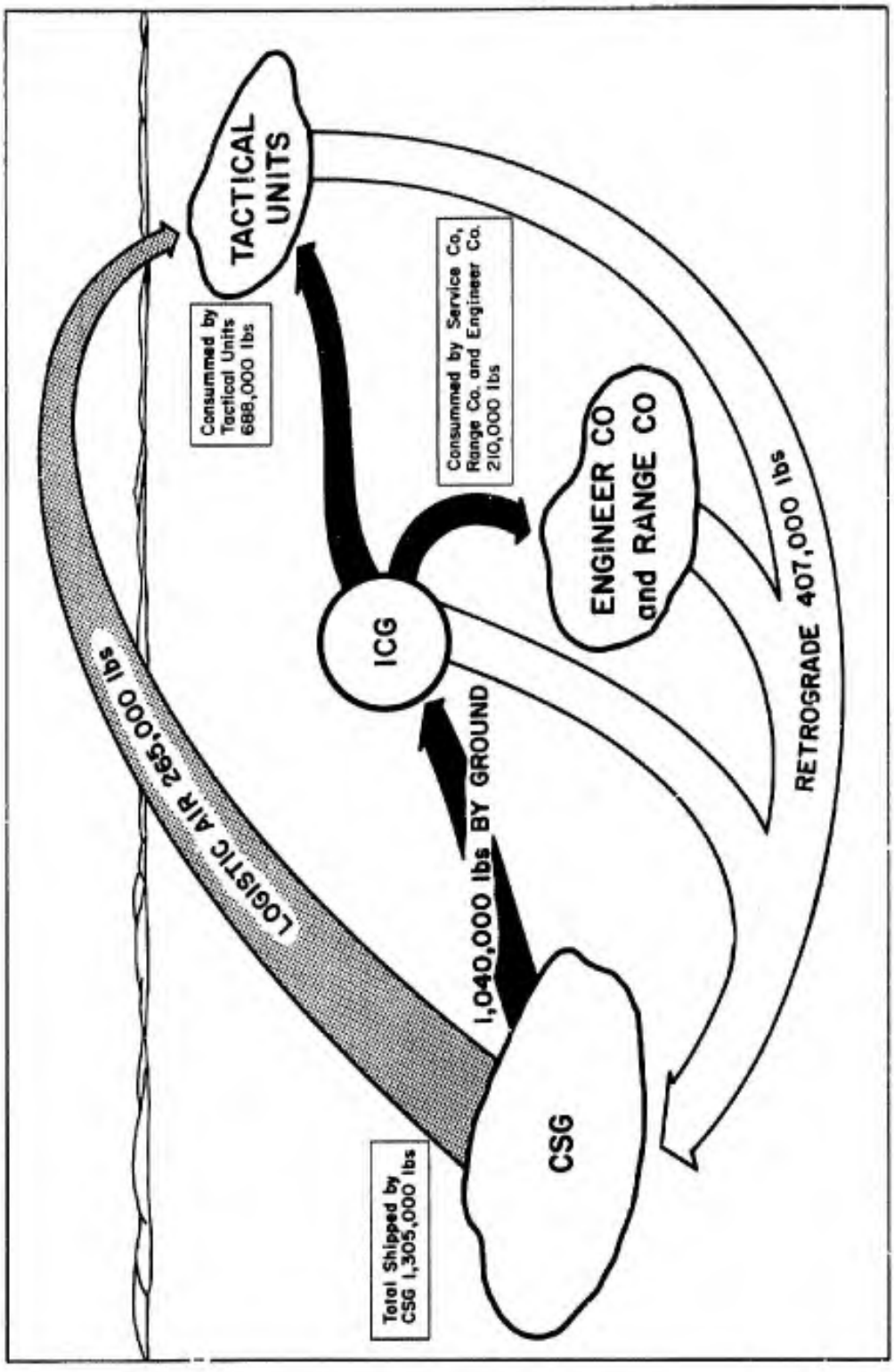


FIGURE B-1 FLOW OF SUPPLIES

5. LIFT CAPABILITY UTILIZED

Tables B-7 and B-8 depict, for the CSG Movements Company and the ICG Supply Platoon respectively, the number of dry-cargo vehicles that would have been required to transport the actual weight and cube of daily requirements. The figures used in computing the vehicles required are the weights and cubes computed from the simulators hauled. The results presented in the tables do not take into consideration that it is possible for one truck to make more than one trip per day, but are figured on the basis of one trip per truck per day. It is obvious from the tables that neither the CSG Movements Company nor the ICG Supply Platoon would have had difficulty in meeting their delivery requirements even if the actual weights and cubes had been delivered.

TABLE B-7

NUMBER OF 12-TON TRACTOR-TRAILERS

REQUIRED TO TRANSPORT DAILY CSG REQUIREMENTS

Date	Tons Carried	Cube	Nr of Vehicles Required
May 9	34.69	1,549	3
10	12.39	518	2
11	67.28	2,701	6
12	54.89	2,046	5
13	4.20	112	1
16	29.96	1,313	4
17	19.74	777	3
18	28.90	1,134	4
19	35.66	1,228	4
23	29.76	1,021	4
24	68.96	2,129	6
25	37.26	1,180	5
26	25.19	865	3
June 1	25.26	937	3
2	9.90	414	2
6	43.72	1,519	5
7	50.28	1,728	6
TOTAL	578.04	21,171	Nr Vehicles Required to Carry Average Load = 3
AVG	34.00	1,245	

NOTE: Capacity of one 12-Ton is 12 tons, or 1,300 Cu Ft.
Number of 12-Ton Tractor-Trailers available to CSG was 9.

TABLE B-8

NUMBER OF 2 1/2 TON TRUCKS REQUIRED TO TRANSPORT DAILY ICG TONNAGES

Date	Tons Carried	Cube	Nr of Vehicles Required
May 9	14.32	607.3	6
10	13.80	597.2	6
11	18.98	851.5	8
12	46.47	1,783.4	19
16	7.53	248.2	3
17	29.72	1,064.6	12
18	26.08	963.5	11
19	5.52	172.3	3
23	34.68	1,118.8	14
24	26.46	851.2	11
25	29.82	932.7	12
June 1	18.46	646.3	8
2	3.30	173.6	2
7	21.46	571.5	9
8	1.08	22.4	1
TOTAL	296.68	10,605.	Nr Vehicles Required to Carry Avg Load = 8
AVG	19.78	707	

NOTE: Capacity of one 2 1/2 Ton truck is 5000 lbs and 380 cubic ft. Number of 2 1/2 Ton trucks available to the ICG was 22.

6. TRAVEL TIME AND DISTANCE

a. The total one-way travel time for ground cargo vehicles between the CSG and the Supply Platoon for the entire experiment was 85.37 hours. This figure is based on 53 vehicle trips. The average travel time per trip, the average distance traveled per trip, the average travel time per day, and the average distance traveled per day for all ground vehicle trips between the CSG and the Supply Platoon were calculated using three different approaches as shown on lines 1, 2, and 3 of Table B-9 below. The average in line 1 of the table was based on the 53 vehicle trips; however, since there were 10 of these vehicle trips which had no mileages recorded for them, no average is calculated for the distances. The second average was calculated using the 43 vehicle trips which had mileages recorded for them to find the average travel time and average distance traveled per trip. In calculating the average travel time and the average distance traveled per day, this figure was multiplied by 53 since there were 53 known vehicle trips, and then divided by 23 which was the number of days in the experiment. The third average was obtained by using 41 of the 43 travel times which had mileages associated with them, since 2 of the 43 trips had mileages which seemed out of line with the other mileages. The average travel time and the average distance traveled were calculated based on these 41 vehicle trips; and the average travel time and the average distance traveled per day were calculated in the same manner as these items in line 2 of the table.

TABLE B-9

AVERAGE TRAVEL TIME AND DISTANCE

FOR TRIPS BETWEEN CSG AND ICG SUPPLY PLATOON

Basis *	Average per Trip		Average per Day	
	Travel Time (hours)	Distance Traveled (miles)	Travel Time (hours)	Distance Traveled (miles)
1	1.61		3.71	
2	1.62	37.42	3.73	86.23
3	1.55	36.61	3.57	84.36

* See text above for explanation

b. The total one-way travel time for ground cargo vehicles between the Supply Platoon and all supported units for the entire experiment was 31.25 hours. This figure is based on 65 vehicle trips. The average travel time per trip, the average distance traveled per trip, the average travel time per day, and the average distance traveled per day for all ground vehicle trips between the Supply Platoon and all supported units were calculated using three different approaches as represented by lines 1, 2, and 3 of Table B-10. The average in line 1 of the table was based on the 65 vehicle trips. However, since there were 25 of these vehicle trips which had no mileages recorded for them no average is calculated for the distances. The second average was calculated using the 40 vehicle trips which had mileages recorded for them to find the average travel time and average distance traveled per trip. In calculating the average travel time and the average distance traveled per day, the average travel time and the average distance traveled per trip was multiplied by 65 since there were 65 known vehicle trips, and then divided by 23 which was the number of days in the experiment. The third average was obtained by using 37 of the 40 travel times which had mileages associated with them since 3 of the 40 trips had mileages which seemed out of line with the other mileages. The average travel time and the average distance traveled were calculated based on these 37 vehicle trips; and the average travel time, and the average distance traveled per day were calculated in the same manner as these items in line 2 of the table.

TABLE B-10

AVERAGE TRAVEL TIME AND DISTANCE

FOR TRIPS BETWEEN ICG SUPPLY PLATOON AND SUPPORTED UNITS

	Average per Trip		Average per Day	
Basis*	Travel Time (hours)	Distance Traveled (miles)	Travel Time (hours)	Distance Traveled (miles)
1	.48		1.36	
2	.47	9.88	1.33	27.92
3	.42	9.32	1.19	26.34

* See text above for explanation

Annex C

Maintenance Data

This annex presents a brief summary of the data for the maintenance portion of the ICG Phase III Logistical experiment. The tables included here were selected to given an over-all picture of the results, and also for their application to the discussion presented in Section III of this report. A detailed record of the maintenance data is contained in a Research Memorandum (RO-RM 4) on file at the USA CDEC Research Office. The contents of the present annex are as follows:

1. NUMBER OF BREAKDOWNS

Table C-1 summarizes the total number of vehicle breakdowns for the entire experiment. The figures presented in this first table should be distinguished from those given in the following tables, since the latter are all based on repair actions. Obviously a single vehicle breakdown might, and often did, involve separate actions by more than one team, and accordingly the totals presented in Table C-1 do not necessarily coincide with those shown in the following tables.

The purpose of Table C-1 is to reveal the number of breakdowns for each type of vehicle listed, together with the class, or reason for breakdown. Several interesting points are revealed by the table. First, 50% of all the listed breakdowns were attributed to one vehicle type, the M-59 Armored Personnel Carrier. Since these vehicles constituted only 20% of the total number of vehicles supported during the experiment, it is apparent that they required a disproportionate share of maintenance attention.

Also of interest are the large number of electrical breakdowns listed for "unknown" vehicles. Undoubtedly most of these were radio failures wherein the defective set had been removed from the vehicle prior to repair, and thus could not be attributed to any particular vehicle.

Another entry worth comment is the large number of breakdowns listed for causes other than the six classes of breakdown specified by name. The explanation for these "other" breakdowns lies in the limited classification system followed for the purpose of data reduction. Out of the 200 or so classes of breakdown provided by Ordnance Tank and Automotive Command code numbers, six were chosen which, on the basis of past experiments, could be expected to include most of the breakdowns encountered. And, in fact, some 75% of the breakdowns recorded did occur in the six classes selected. However, it might be profitable in future experiments to add other classifications, especially if further study of the present breakdown data reveals any particular grouping within the miscellaneous group.

TABLE C-1

NUMBER OF BREAKDOWNS BY VEHICLE TYPE AND BY CLASS OF BREAKDOWN

Vehicle Type	Cooling	Engine	Electrical	Fuel	Suspension	Transmission	Other	TOTAL
1/4 Ton	2	1	11	3	1	2	9	29
3/4 Ton	1	1	10	5			1	18
2 1/2 Ton	2	4	3	1	1	2	45	58
M-56		1	27	4	5	2	3	42
M-59	33	69	57	39	29	46	55	328
M-41	1	2	12	1	1		3	20
M-48	5	4	14	5	6	6	15	55
Dozer							4	4
Grader						1		1
Payloader		3				1	2	6
Payloader Super C						1	2	3
Tow Motor			1					1
Unknown	1	2	68	1			24	96
TOTAL	45	87	203	59	43	61	163	661

2. SUMMARY OF REPAIR ACTIONS

Table C-2, C-3, and C-4, summarize the pertinent data concerning repair actions executed by the various maintenance elements. Included are the numbers of actions, the percentage of actions involving M-59s, the percentage of timed actions requiring less than 2 hours' working time, the data regarding travel distances and times, and the expenditure in man-hours.

The tables show certain consistent patterns: the major expenditure of effort on M-59s; the majority of repair actions requiring less than two hours (even for the CSG teams which, under the conditions of the experiment, were allowed a six-hour time limit). The latter pattern is brought out graphically in Figure C-1, which depicts the over-all frequency distribution of repair times.

TABLE C-2

REPAIR ACTIONS BY CSG MAINTENANCE COMPANY

	Maint Area	Teams					All CSG Teams
		Recov	Retriever	Contact	Signal Maint	Welder	
Total Number of Recorded Repair Actions	75	18	20	28	32	9	182
Number of Actions on M-59s	33	6	16	15	NA	3	73
Ratio = M-59 Actions / Total Actions	.440	.333	.800	.535	NA	.333	.401
Number of Actions Recorded as to Time	33	13	17	26	28	6	123
Number of Actions Less Than 2 Hours	25	13	14	21	26	6	105
Ratio = Actions Under 2 Hours / Actions Recorded as to Time	.758	1.000	.824	.808	.929	1.000	.853
Average Distance Travelled (miles)	7.0	6.2	6.9	4.3	2.7	6.0	5.5
Average Time of Trip (min)	31.6	24.0	34.0	21.7	8.8	20.0	23.4
Average Man-Hours Lost per Trip	1.7	0.9	3.0	1.0	0.2	0.6	1.4
Average Man-Hours Expended per Job	2.9	1.6	4.2	2.4	0.74	0.50	2.1

TABLE C-3
REPAIR ACTIONS BY ICG MAINTENANCE PLATOON

	Maint Area	Teams					All ICG Teams
		Fwd Maint	Recov	Contact	Wheeled Vehicle Repair	Sig Maint	
Total Number of Recorded Repair Actions	54	401	20	91	13	119	698
Number of Actions on M-59s	16	238	19	35	7	NA	365
Ratio = $\frac{\text{M-59 Actions}}{\text{Total Actions}}$	.296	.718	.956	.384	.538	NA	.524
Number of Actions Recorded as to Time	47	365	17	76	10	96	611
Number of Actions Less Than 2 Hours	37	328	12	71	7	89	544
Ratio = $\frac{\text{Actions Under 2 Hours}}{\text{Actions Recorded As to Time}}$	.787	.899	.706	.934	.700	.927	.890
Average Distance Travelled (miles)	3.3	3.0	4.4	5.2	1.6	4.2	3.6
Average Time of Trip (min)	13.5	13.1	26.0	19.8	14.7	15.3	17.1
Average Man-Hours Lost per Trip	1.0	2.6	1.3	0.8	0.6	0.6	1.2
Average Man-Hours Expended per Job	2.0	1.5	3.6	1.4	3.8	0.8	2.2

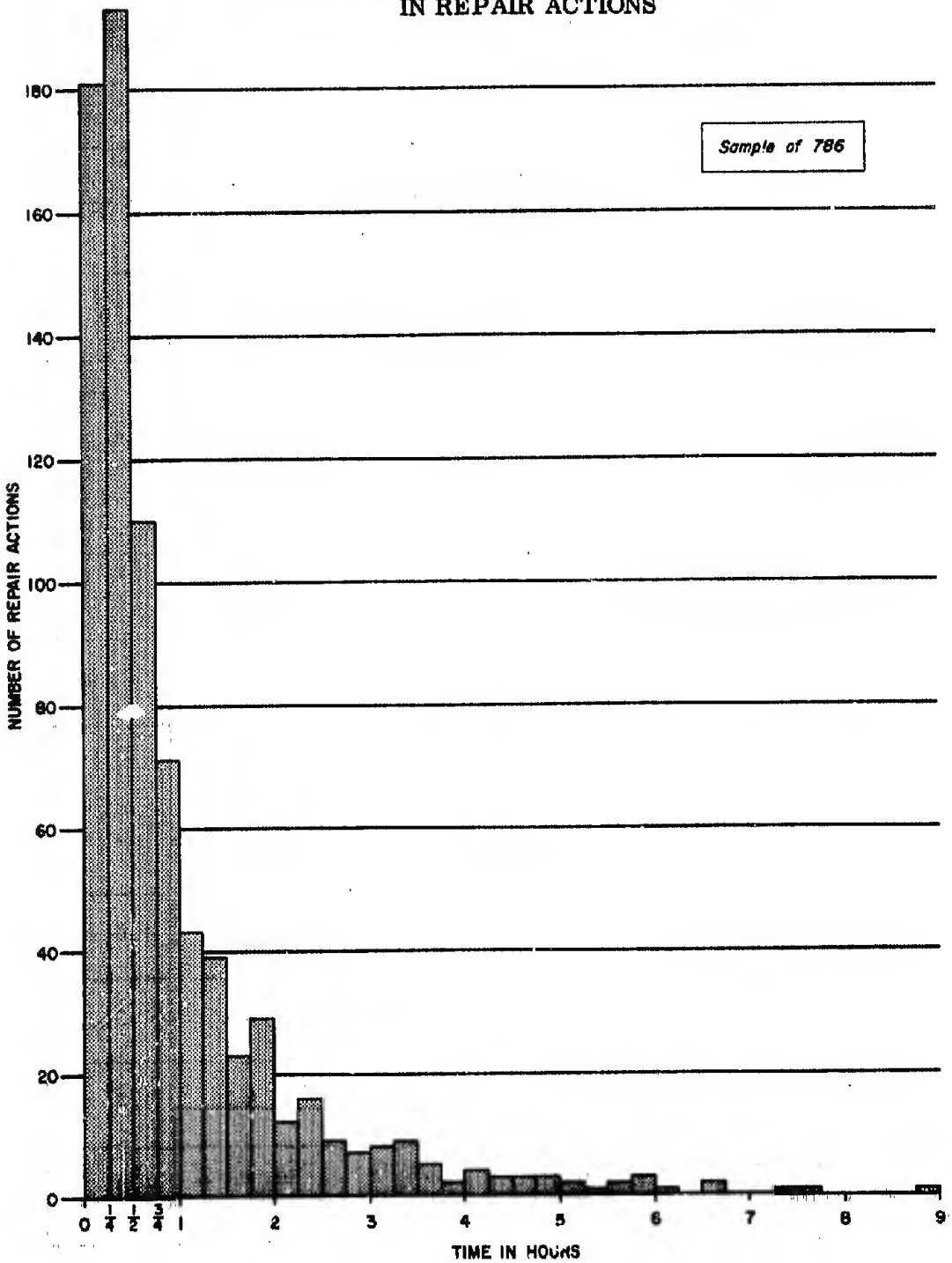
TABLE C-4

SUMMARY OF REPAIR ACTIONS

(Including Those by Unknown Teams)

	CSG Maintenance Company	ICG Maintenance Platoon	Unknown Teams	TOTALS
Total Number of Recorded Repair Actions	182	698	146	1,026
Number of Actions on M-59s	73	365	60	498
Ratio = $\frac{\text{M-59 Actions}}{\text{Total Actions}}$	.401	.524	.411	.445
Number of Actions Recorded as to Time	123	611	52	786
Number of Actions Less than 2 Hours	105	544	42	691
Ratio = $\frac{\text{Actions Under 2 Hours}}{\text{Actions Recorded as to Time}}$	.853	.890	.808	.878
Average Distance Travelled (miles)	5.5	3.6	NA	4.6
Average Time of Trip (min)	23.4	17.1	NA	20.3
Average Man-Hours Lost per Trip	1.4	1.2	NA	1.3
Average Man-Hours Expended per Job	2.1	2.2	1.2	1.8

FIGURE C-1
FREQUENCY DISTRIBUTION OF TIME SPENT
IN REPAIR ACTIONS



3. UTILIZATION OF MANPOWER

Table C-5, following, shows the estimated number of man-hours required for maintenance activities during the experiment, as compared with the total number of such man-hours available within the maintenance support units.

The man-hours available were computed on the basis of an 8-hour day, 4-day week, during the period of the experiment, for all TOE maintenance personnel within the support units examined.

The "man-hours used" figure includes recorded repair times plus travel times, plus an adjustment for known repair jobs which were not recorded as to time. On the assumption that the unrecorded times followed the same distribution as those recorded, the total of known man-hours has been increased by the approximate percentage of repair actions which were unrecorded as to time. These percentages were 33% for the CSG and 13% for the ICG maintenance units, respectively. While the large percentage for the CSG presumably reflects a large number of incompleted repair jobs which were referred for administrative action, it was noted that in almost every such case, the inability of the CSG to complete repairs was due to a lack of authorized spare parts and/or tool kits.

TABLE C-5

MAN-HOURS AVAILABLE VS ESTIMATED MAN-HOURS REQUIRED

	Total Man-Hours Available*	Estimated Man-Hours Required*	% Available Man-Hours Required
CSG Maintenance Co	20,736	624	3%
ICG Maintenance Platoon	16,320	1,703	10%

* See text above for basis of computation

Annex D

Medical Data

This annex contains a brief summary of the data for the medical portion of the ICG Phase III Logistics experiment. The tables and graphs included here were selected to give an over-all picture of the results, and also for their particular application to the discussion presented in Section IV of this report. A much more detailed record and discussion of the data for the medical experiment is contained in a Research Memorandum (RO-RM 3) on file at the USA CDEC Research Office. The contents of this annex are as follows:

1. NUMBER OF CASUALTIES

Table D-1 shows the numbers of casualties handled during the experiment according to the various combinations of casualty-rate and casualty classes examined.

Table D-2, showing the actual and planned placement times for the various workload combinations, points up an important deviation which occurred with regard to the placement, or "generation," of casualties. The design of the experiment intended that all casualty-time distributions would be linear, i.e., that an even rate of casualty placement would occur during the 1-hour, 3-hour, and 5-hour time spans allowed for the emplacement of casualties. It appears from the table that it was not possible to place even 20 casualties in location in one hour. The time span required in all instances exceeds one hour, in most cases taking from 75 to 90 minutes.

Table D-3 shows the numbers of casualties evacuated via the alternate routes as determined by the senior aidman: Path 1 representing indirect evacuation to the ICG Aid Station via the company collecting post, and Path 2 representing evacuation directly from the battle area to the ICG Aid Station.

Table D-4 summarizes the results of the experiment in terms of the average number of casualties per location, average number of casualty locations, and average number of casualties carried per trip to the ICG.

TABLE D-1

TOTAL NUMBER OF CASUALTIES

AND

NUMBER OF CASUALTIES BY CLASS

Workload		Total Nr Casualties*	Immediate 2-Hour Casualties	Emergency 6-Hour Casualties	Delayed 12-Hour Casualties
20 Casualties	1 Hour	218	60	71	87
	3 Hour	40	11	13	16
	5 Hour	40	8	12	20
50 Casualties	1 Hour	50	12	16	22
	3 Hour	149	32	50	67
	5 Hour	99	19	37	43
80 Casualties	1 Hour	161	30	55	76
	3 Hour	157	19	54	84
	5 Hour	160	38	46	76

* These figures represent casualties recorded--a total of 1074 out of the 1080 casualties scheduled.

TABLE D-2

CASUALTY PLACEMENT TIMES

(In Minutes)

Workload		Actual		Planned	
		Mean	Std Dev	Mean	Std Dev
20 Casualties	1 Hour	39.06	26.86	30	20
	3 Hour	81.12	42.45	90	60
	5 Hour	142.75	95.90	150	100
50 Casualties	1 Hour	34.18	24.82	30	20
	3 Hour	96.45	57.32	90	60
	5 Hour	141.58	85.48	150	100
80 Casualties	1 Hour	37.47	21.37	30	20
	3 Hour	83.83	52.50	90	60
	5 Hour	162.83	104.10	150	100

TABLE D-3

NUMBER OF CASUALTIES EVACUATED

VIA PATH 1 AND PATH 2

Workload		Total Nr Casualties	Nr Cas Path 1	Nr Cas Path 2
20 Casualties	1 Hour	218	40	178
	3 Hour	40	15	25
	5 Hour	40	7	33
50 Casualties	1 Hour	50	17	33
	3 Hour	149	62	87
	5 Hour	99	31	68
80 Casualties	1 Hour	161	47	114
	3 Hour	157	41	116
	5 Hour	160	62	98

TABLE D-4

AVERAGE NUMBER OF CASUALTIES PER LOCATION

	20 Casualties	50 Casualties	80 Casualties
1 Hour	1.6	3.3	3.8
3 Hour	1.0	1.4	2.5
5 Hour	1.0	1.1	2.4

AVERAGE NUMBER OF LOCATIONS OF CASUALTIES PER SITUATION

	20 Casualties	50 Casualties	80 Casualties
1 Hour	13	15	21
3 Hour	20	36	32
5 Hour	20	45	33

AVERAGE NUMBER OF CASUALTIES PER TRIP TO THE ICG

	20 Casualties	50 Casualties	80 Casualties
1 Hour	3.5	3.6	3.5
3 Hour	2.5	4.0	3.5
5 Hour	1.9	3.7	3.8

2. TIMES FOR VARIOUS STEPS IN EVACUATION

Tables D-5 through D-8 shows the times required for various steps along the evacuation channel from battlefield to the ICG Aid Station. While a breakdown of times for each step of the way is not presented in this summary of the data, it will be noted that collectively the last three tables account for the total interim from occurrence through final unloading of casualties at the ICG Aid Station. The particular purpose of Table D-5 is to illustrate an important point discussed in the main text (Section IV, para E-1b); namely, that although travel times, treatment times, and loading and unloading times were approximately the same for either evacuation route, a major difference occurred in ambulance assignment times.

Table D-5 compares the times required from occurrence of a casualty to assignment of an ambulance to that casualty, for casualties subsequently evacuated by each of the two routes.

Table D-6 gives the times from occurrence to arrival of the ambulance, for all casualties and also for those subsequently evacuated by either path.

Table D-7 shows treatment times at the battle area.

Table D-8 shows evacuation time, or the elapsed time between start of load at battle area and completion of unload at the ICG Aid Station. The differences between the two paths shown in this time measure again concern the availability of ambulances. Since travel distances, travel times, and unloading times were essentially the same for both routes, the additional time required via Path 1 represented delays at the COAP.

TABLE D-5

TIME TO ASSIGNMENT OF AMBULANCE

(Time in Minutes)

Workload		Path 1	Path 2
20 Casualties	1 Hour	12.8	31.7
	2 Hour	39.3	36.0
	5 Hour	9.5	22.6
50 Casualties	1 Hour	12.8	31.6
	3 Hour	40.8	65.9
	5 Hour	52.8	124.4
80 Casualties	1 Hour	84.1	138.8
	3 Hour	44.7	108.7
	5 Hour	33.1	58.1

TABLE D-6

TIME TO ARRIVAL OF AMBULANCE

(Time in Minutes)

All Casualties

	20 Casualties	50 Casualties	80 Casualties
1 Hour	38.9	37.8	131.1
3 Hour	47.7	57.0	106.9
5 Hour	28.1	109.9	59.4

Path 1

1 Hour	25.9	18.8	84.8
3 Hour	51.3	43.7	36.8
5 Hour	27.7	65.4	38.3

Path 2

1 Hour	42.0	47.7	151.4
3 Hour	45.6	66.3	131.1
5 Hour	28.2	130.8	71.6

TABLE D-7

TREATMENT TIMES AT BATTLE AREA

(Time in Minutes)

		20 Casualties		50 Casualties		80 Casualties	
		Path 1	Path 2	Path 1	Path 2	Path 1	Path 2
Immediate 2-Hour Casualties	1 Hour	4.83	8.21	8.00	9.30	8.00	8.52
	3 Hour	9.33	9.28	12.20	6.41	NA	8.68
	5 Hour	2.00	9.42	6.33	6.25	4.66	8.90
Emergency 6-Hour Casualties	1 Hour	5.16	8.10	6.57	10.22	5.53	7.12
	3 Hour	5.50	3.85	6.60	6.46	4.33	8.61
	5 Hour	4.00	6.88	6.75	7.17	4.64	7.34
Delayed 12-Hour Casualties	1 Hour	6.40	5.85	3.55	4.61	5.57	5.20
	3 Hour	4.33	5.20	5.27	5.33	5.72	5.75
	5 Hour	5.33	5.20	4.15	4.00	5.55	4.82

TABLE D-8

EVACUATION TIME TO ICG

(Elapsed Time Interval in Minutes Between Start of Load At Battle Area and End Unload at ICG)

		20 Casualties	50 Casualties	80 Casualties
All	1 Hour	63.9	77.6	104.7
	3 Hour	71.7	110.8	101.5
	5 Hour	54.2	112.6	111.4
Path 1	1 Hour	92.7	122.6	191.5
	3 Hour	86.8	161.9	200.8
	5 Hour	84.7	179.4	183.4
Path 2	1 Hour	57.7	60.9	72.6
	3 Hour	63.2	73.9	66.6
	5 Hour	47.3	80.9	63.5

3. PERFORMANCE

Table D-9 summarizes the performance of the ICG Medical Platoon by showing total numbers of casualties evacuated, and numbers and percents of those casualties evacuated "successfully." For the purpose of this measure of performance, a successful evacuation is defined as one wherein the casualty received treatment at the ICG Aid Station before expiration of the delay time limit prescribed for his class of wound.

Figure D-1 is a further demonstration of the finding that performance is a function of ambulance availability, as measured by assignment time. The graph indicates that despite the over-all time difference between evacuations by Paths 1 and 2, the performance in either case decreased at the same rate as did performance according to assignment time.

Figure D-2 plots performance as a function of workload. Each plotted point represents one of the nine possible casualty-time combinations used as experimental variables, these combinations having been transposed into the hourly casualty rate represented by each. The graph indicates that performance decreased as the workload increased, but it also indicates that the rate of decrease in the performance measure was not proportionate to the sharp increase in workload from the extremes of 4 casualties per hour to 80 casualties per hour.

TABLE D-9

SUMMARY OF MEDICAL PLATOON PERFORMANCE

		Total Nr Casualties Generated	Total Nr Casualties Evacuated	Nr Successful	Nr Unsuccessful	Performance *
20 Casualties	1 Hour	220	218	181	37	83.0
	3 Hour	40	40	34	6	85.0
	5 Hour	40	40	37	3	92.5
50 Casualties	1 Hour	50	50	41	9	82.0
	3 Hour	150	149	111	38	74.5
	5 Hour	100	99	70	29	70.7
80 Casualties	1 Hour	160	161	105	56	65.2
	3 Hour	160	157	122	35	77.7
	5 Hour	160	160	135	35	78.1
TOTALS		1,080	1,074	826	248	76.9

* Ratio of successful evacuations to total evacuations

FIGURE D-1

EFFECT OF ASSIGNMENT TIME ON PERFORMANCE

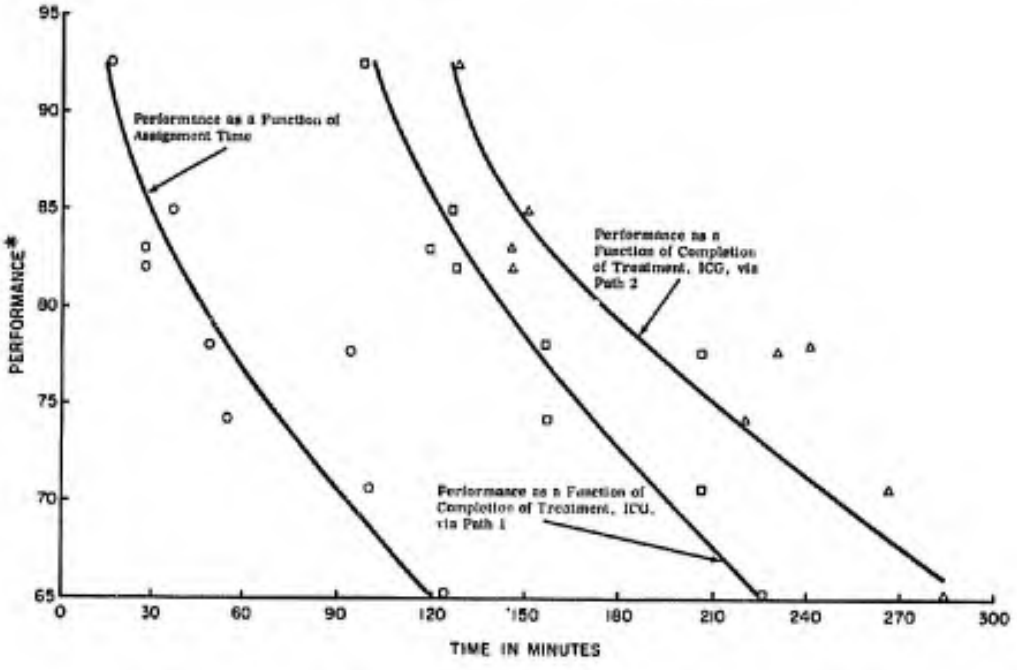
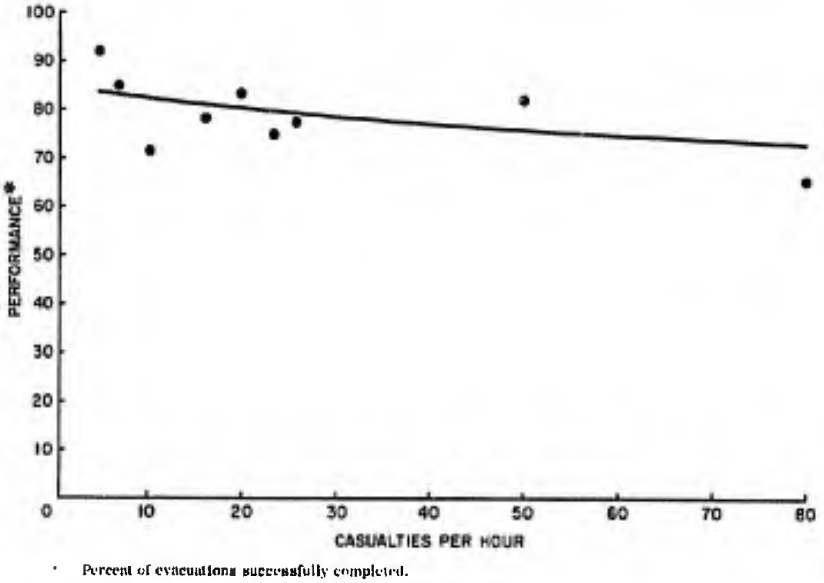


FIGURE D-2

PERFORMANCE VS HOURLY CASUALTY RATE



* Percent of evacuations successfully completed.

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13. ABSTRACT

Phase III represents the third in a series of tactical field experiments designed to examine organizational and operational concepts of a PENTANA integrated combat group (ICG). This volume examines the capabilities and limitations of the PENTANA ICG service company and the service elements of the PENTANA forward intransit depot in meeting support requirements of the ICG and its attached units in selected resupply, maintenance, and evacuation. This experiment was a continuation of the logistics studies started in Phases I and II. Like the other experiments in the series, it provided data for statistical analysis and military evaluation. (U)

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
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