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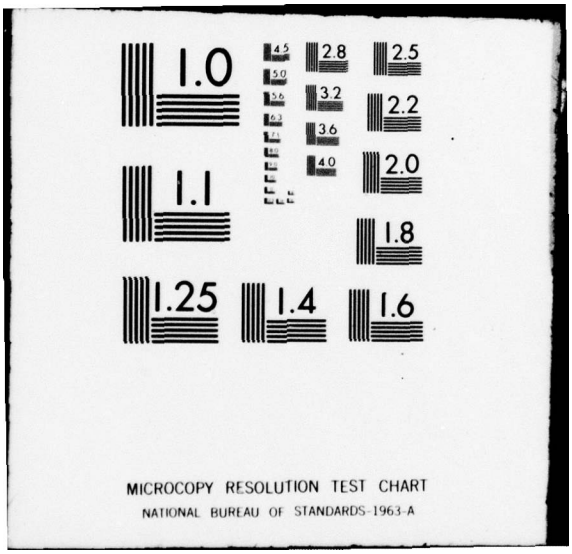
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DEVELOPMENTAL TEST II

OF

PERSONNEL ARMOR SYSTEM FOR GROUND TROOPS (PASGT)

TEST PLAN

BY

(10) BENJAMIN P. OWEN
MAJ, IN

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(6) Developmental Test II of Personnel Armor System for Ground Troops (PASGT). Test Plan

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DEPARTMENT OF THE ARMY
HEADQUARTERS, U. S. ARMY TEST AND EVALUATION COMMAND Mr McAuley/jer/
ABERDEEN PROVING GROUND, MARYLAND 21005 283-3640

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8 SEP 1976

SUBJECT: Test Plan, Development Test II of Personnel Armor System for Ground Troops (PASGT), TECOM Project No. 8-EI-525-000-016

Commander
USA Natick Research and Development Center
ATTN: DRXNM-EPT
Natick, Massachusetts 01760

Subject detailed test plan has been approved by this headquarters and is provided for information.

FOR THE COMMANDER:

Douglas H. Farmer

DOUGLAS H. FARMER
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Dir, Inf & Trp Spt Mat Test

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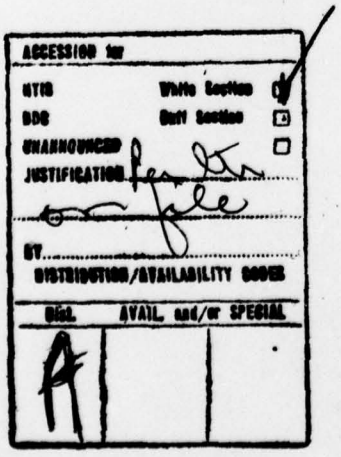
(Addressees specified in Detailed Test Plan distribution)



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SECTION 1 - INTRODUCTION

1.1 BACKGROUND

a. Current standard helmets and items of body armor have deficiencies in the amount of physiological stress produced, the reluctance of troops to wear items which cause discomfort, and the limited degree of protection afforded, either with respect to what munitions can be stopped or the body area coverage, or both. As a result of these deficiencies, Army Materiel Command (AMC) directed, in March 1970, that a comprehensive Five-year Personnel Armor System Technical Plan be prepared for a research and development program aimed at producing an improved personnel armor system. The casualty producing capabilities of standard fragmentation and improved conventional munitions are improving rapidly and are major threats to the individual. Therefore, a need exists for a personnel armor system that will reduce the number of battlefield deaths and wounds by protecting the vital body areas against these threats. A Materiel Need (MN) for a Personnel Armor System for Ground Troops (PASGT) was approved by Department of the Army in January 1973.

b. Under the Personnel Armor Technical Plan, a prototype fragmentation protection subsystem, consisting of a helmet and body armor, has been developed to meet the system characteristics specified in the MN. The system is designed to provide greater casualty reduction potential against defined fragmentation threats when compared to the present standard items, with component weights equivalent to those of the present items. The improved protection is proposed to be achieved by the use of a new polyamide textile material, known commercially as "kevlar". The system has been identified as a "designated non-major system" and has the Natick Research and Development Command (NARADCOM) assigned with the developmental responsibility.

c. The U.S. Army Training and Doctrine Command (TRADOC) cost operational effectiveness analysis (COEA) concluded that only the candidate "kevlar" vest is suitable for further development. The COEA also concluded that three candidate helmets existed.

(1) A 38 oz/ft^2 kevlar

(2) A 38 oz/ft^2 fiberglass

(3) A 30 oz/ft^2 kevlar

The formal validation In-Process Review (IPR) held on 17 December 1975 recommended that the PASGT body armor and three candidate helmets be included in DT II and OT II. The IPR recommendation was approved by DA on 20 January 1976.

d. The authority to conduct this test is contained in the test directive, dated 3 June 1976 (appendix A).

1.2 DESCRIPTION OF MATERIEL

a. The prototype system consists of a torso component and three candidate helmets with nape pad and attached suspension system and chin strap described as follows:

(1) Vest, Kevlar, Fragmentation Protection: The experimental vest covers the upper torso and consists of a ballistic filler of 14 oz/yd^2 kevlar and an inner and outer shell of surface resistant (SR) treated 8 oz/yd^2 ballistic nylon. The layer which makes up the inner shell of the vest is in the camouflage colors and design. The kevlar ballistic filler in the back is made in four sections. The three upper back sections slide over each other and over the lower back section to allow for any changes in body dimensions associated with various movements. The front closure is made of velcro "touch and close" tape. The side overlaps are made flexible through the use of sewn-in 1 1/2-inch wide elastic webbing. The vest also has a 3/4 collar, articulating shoulder pads, two front pockets, two grenade hangers and rifle butt patches at the shoulder front area. The vest is provided in four sizes and is designed to provide increased protection and to improve the wear's combat mobility and comfort. The vest weighs 9 pounds in the medium size.

(2) Helmet, Kevlar (38 oz/ft^2), Fragmentation Protective: The helmet consists of 16 plies of high tenacity, high modulus, polyamide fabric in a 2 x 2 basketweave construction. The fabric is coated with 18 to 20 percent phenolic/polyvinyl butyral resin. The fabric is then cut into star-shaped preforms and each ply is layed-up into a basket like construction prior to molding. The final helmet is then compression molded at approximately 2000 psi with a molding cycle of approximately 12 minutes. The helmet is one piece construction in three sizes exhibiting low profile, close fit and low center of gravity. The design features of the helmet consist of a small brim at the front and increased head coverage over that provided by the standard helmet at the temples, ears, and neck. The helmet is designed to fit the 1st to 99th percentile man with increased area coverage and increased protection. Weight of this helmet with attached suspension system and chin strap are: small - 47 oz., medium - 49 oz., and large - 53 oz.

(3) Helmet, Kevlar (30 oz/ft^2): This helmet is identical to the 38 oz/ft^2 kevlar candidate except that kevlar fabric of a lower density (30 oz/ft^2) is used. Weights of this helmet with attached suspension system and chin strap are: small - 38 oz, medium - 40 oz., large - 43 oz.

(4) Helmet, Glass Reinforced Plastic (GRP) (38 oz/ft^2): This helmet is of the same design and weight as the 38 oz/ft^2 kevlar helmet. The ballistic material is glass reinforced plastic fabricated from 38 oz/ft^2 Woven Roving Fiberglass which is molded and laminated with a polyester type resin.

(5) Helmet Suspension System: The suspension system is a cradle type that is attached to the helmet with screws and threaded A-washers, which allows replacement while minimizing the amount of hardware on the inside of the helmet, thereby reducing the possibility of injury from impact. The construction is nylon with a self-compensating-drawstring type adjustment at the top. The drawstring uses a velcro tab for rapid adjustment and is sized to preclude contact of the helmet with the top of the head under all conditions. The headband utilizes velcro pile to cushion the headband clips and prevent contact with the head. The headband clips are of a new design with a positive lock to preclude release under impact. The leather covering of the headband is not sewn at the top, and overlaps the top of the sweatband itself. The chin strap utilizes pivots at the attachment point in order to provide better comfort and incorporates a new style buckle for easier adjustment. In general, the suspension system is designed to provide increased stability by having a high tension in the circumferential straps and uniform tension in the over-the-head straps; increased safety by minimizing the amount of interior hardware; and increased comfort by a combination of features of the headband and chin strap.

(6) Parachutist's Nape Pad: A trapezoid shaped nape pad has been developed for use with the PASGT helmets. It is fabricated of 1/2-inch thick gray "decello" foam and is provided in one size with three sides approximately 6 inches long and the remaining side is 3 inches long. The pad is intended as a one time issue/throw away item.

b. Standard items used for comparison with the PASGT:

(1) Helmet, Ground Troops, NSN 8470-00-255-8579.

(2) Liner, Ground Troops, Helmet, NSN 8470-00-935-6842.

(3) Helmet, Parachutist, NSN 8470-00-161-9414.

(4) Liner, Parachutist, Helmet, NSN 8470-00-935-6844.

(5) Body Armor, Fragmentation, Protective, NSN 8470-00-122-1299 through NSN 8470-00-122-1302.

1.3 TEST OBJECTIVES

a. Provide an assessment of sizing and fitting characteristics of the PASGT components when worn with environmental clothing (cold weather) in terms of the MN in comparison with those of the standard items.

b. Evaluate the compatibility of the PASGT with items of cold weather uniform and equipment, standard troop type parachute assembly, and protective devices worn (CBR protective mask) or carried by the individual soldier.

c. Evaluate the compatibility of the PASGT with individual and crew served weapons, fire control and communications equipment, as well as vehicles and other equipment used by personnel who will wear the system in comparison to the standard items.

d. Determine the degree to which the PASGT meets the health and safety characteristics in comparison to the standard items.

e. Provide an evaluation of the human factors characteristics specified in the MN for a PASGT in comparison to the standard items.

f. Determine the effects, if any, of short term storage under cold conditions on the wearability of the components, on the protective qualities of the surface resistant finish as evidenced by moisture pickup and retention.

g. Provide an evaluation of the maintenance and training literature, ease of the individual care and cleaning, and an assessment of any maintenance actions required.

1.4 SCOPE

a. The Cold Regions Test Center (CRTC) will conduct a Development Test II (DT II) of the PASGT during the period October 1976 to March 1977. The test will be conducted at Bolio Lake, a subpost of Fort Greely, AK, under cold weather winter conditions.

b. Twenty-five PASGT's will be provided by NARADCOM for test and will be compared to 25 each of the standard ground helmet and armored vest.

c. Evaluations will be made of the compatibility and troop acceptability of the PASGT with all items of individual clothing and equipment, parachute operations, individual weapons, crew served weapons, human factors characteristics, and maintenance and training literature. Test control personnel observations, test participants' opinions and structured interviews, in addition to comparison data, will be used to make the evaluations.

d. Soldiers participating in the test will be representative of those who would use and maintain the PASGT under actual combat conditions. They will wear in addition to the PASGT, the appropriate cold

weather clothing individual combat equipment as appropriate, and Army Lightweight Individual Combat Equipment (ALICE) load bearing equipment (appendix F). Data will be collected while the test soldiers participate in skiing, snowshoeing, artillery, engineer, mortar, and driver related tasks; while they are engaged in negotiating cross country performance courses; and while they participate in field training exercises (FTXs) which include skijouring, mechanized, wheeled vehicle, and airmobile operations. Live fire exercises with individual and crew served weapons will be conducted and scored. Prior to the start of the test, test soldiers will be given a detailed orientation covering the background and objectives of the test, test procedures, and what is expected of them.

e. It will be determined during the conduct of the test if the PASGT has any feature or components which could be improved or redesigned to increase effectiveness of the PASGT without major cost increases. Also to determine if the PASGT has any features or components which could be eliminated to reduce cost without adversely affecting essential performance requirements, reliability, durability, or quality.

f. The PASGT is required to be compatibile with cold weather clothing and equipment. A recent Human Engineering Laboratories (HEL) evaluation of various clothing/armor/equipment ensemblies indicated that both the standard armor and PASGT had compatibility problems when used with cold weather clothing and equipment. Specific doctrine as to the optimal configuration of cold weather clothing and PASGT is not now available. Therefore, it will be necessary to structure the cold weather test with several combinations of clothing/armor/equipment in order to evaluate the acceptability of various ensembles under winter conditions (ref 1, appendix I). As a result of a joint AMSAA/TECOM/HEL meeting, four ensembles have been proposed for inclusion in the cold regions DT II for PASGT. These four ensembles are:

(1) A hybrid cold-wet ensemble formed by removing the field coat and field coat liner and replacing them with the parka and liner. The vest is to be worn under the parka liner (ensemble 1).

(2) Standard cold-dry ensemble with the vest worn under the field coat and liner (ensemble 2).

(3) Standard cold-dry ensemble with vest worn over the field coat (ensemble 3).

(4) A CRTC proposed cold-dry ensemble formed by removing the field coat and field coat liner and wearing the vest under the parka and liner (ensemble 4).

NOTE: Ensembles (1) and (4) modify the standard cold-wet and cold-dry uniforms respectively. The components of the standard cold weather uniforms are listed in appendix F.

Both the standard and test PASGT systems will be used in the same manner so that true comparisons may be made. Minor deviations from the prescribed clothing ensembles might be made if necessary; however, the helmet and vest will remain intact. A change in ensemble will be made only if necessary and will be done uniformly by all test personnel, where possible. All deviations will be fully documented and reported.

In order to adequately assess the compatibility of PASGT with cold weather clothing, it will be necessary to examine the various ensembles mentioned under the different environmental conditions naturally occurring during a typical cold regions winter. This assessment will be based upon the performance of exercises that include tasks normally encountered by the intended users of PASGT during regular duty in the cold regions. These exercises are outlined in paragraph 2.3.3 and will be conducted wearing the uniform ensemble shown in table 1.4.1 at the appropriate temperatures associated with use of each ensemble. The PASGT will be tested in a temperature range from 32°F to the lowest temperature available.

TABLE 1.4.1.--Functional Performance Matrix

Exercises (ref para 2.3.3a)	Uniform Ensembles			
	Cold-Wet /1	Cold-Dry /2	Cold-Dry /3	CRTC Proposed /4
A-Performance Course	X	X	X	X
B-Snowshoe		X		X
C-Ski	X		X	
D-FTX	X	X	X	X
E-Firing	X		X	

/1 Ensemble 1, hybrid cold-wet ensemble will be worn from 32°F to 0°F.

/2 Ensemble 2, standard cold-dry ensemble, with vest worn under the field coat and liner, will be worn from 0°F to lowest temperature available.

/3 Ensemble 3, standard cold-dry ensemble, with vest worn over the field coat and liner, will be worn from 0°F to the lowest temperature available.

/4 Ensemble 4, CRTC proposed ensemble will be worn from 0°F to the lowest temperature available.

g. Four replications of each exercise/ensemble combination in table 1.4.1 will be performed by 20 test soldiers. These soldiers will be divided into four, five-man groups and will wear the PASGT during each replication as shown in table 1.4.2. An exception to the size of the group will be made for an airborne jump test. In this case each group will consist of two qualified airborne soldiers.

TABLE 1.4.2.--PASGT Assignment Table

	Trial 1	Trial 2	Trial 3	Trial 4
Group A	STD	P1	P2	P3
Group B	P1	P3	STD	P2
Group C	P2	STD	P3	P1
Group D	P3	P2	P1	STD

STD = Standard M1 Helmet w/Standard B Nylon Vest
P1 = 38 oz/ft^2 Kevlar Helmet w/PASGT Vest
P2 = 30 oz/ft^2 Kevlar Helmet w/PASGT Vest
P3 = Glass Reinforced Plastic Helmet w/PASGT Vest

h. During each subtest, observations made by test supervisory personnel will be recorded in notebooks designated for that purpose, at the time of an occurrence of interest or as soon thereafter as possible. Entries will include the date and time of the occurrence, applicable subtest, description of the occurrence, and name of the recorder.

i. The medical protocol at appendix H has received concurrence from the office of the Surgeon General and will be used as part of the test soldiers orientation. Test soldiers will be fully informed as to the nature of test activities, data to be collected, potential hazards associated with adverse environments and the precautions to be taken by CRTC.

j. This test plan was prepared IAW the following TOP/MTP:

(1) TOP 10-3-022 (Body Armor), dated 18 August 1972.

(2) TOP 10-3-025 (Helmet), dated 21 January 1972.

(3) ATC MTP - Arctic Environmental Test of Body Armor and Helmets, (Revised) 13 April 1970. Questionnaires in appendices A and B were rewritten to provide applicability for this test.

SECTION 2 - DETAILS OF TEST

2.1 PREOPERATIONAL INSPECTION

2.1.1 Objective

Determine if the PASGT items are in proper condition for testing.

2.1.2 Criterion

None.

2.1.3 Method

a. All PASGT will be inspected upon arrival at CRTC for defects or damage caused during shipment. If defects are found or damage detected, photographs will be taken and data recorded and reported.

b. All of the PASGT's will be marked for identification immediately after receipt, and one PASGT will be photographed. Special attention will be given to identification of test and standard helmets forwarded to CRTC by the U.S. Army Aeromedical Research Laboratory (USAARL) (para 6f, appendix A).

2.1.4 Data Required

Photographs of any defects noted and/or damaged caused during shipment.

2.1.5 Analytical Plan

None.

2.2 SIZING AND FITTING WITH COLD WEATHER UNIFORMS

2.2.1 Objective

Determine if the three tariff sizes of the helmet assembly and four tariff sizes of the fragmentation armor are sufficient to accommodate the test personnel while wearing cold weather uniforms.

2.2.2 Criterion

PASGT must permit easy donning and doffing (para VId(1), MN).

2.2.3 Method

a. Anthropometric measurments will be taken of each test soldier in accordance with Section II and III, TM 10-227, Fitting of Men's Uniforms dated October 1967.

b. Every test soldier will be sized and fitted with PASGT and standard items while wearing each uniform ensemble. Information will be recorded as to the ability of the PASGT to make accomodation within the tariff sizes with the cold weather uniforms. Sizing and fitting will be accomplished in accordance with the care and use pamphlet provided by NARADCOM.

c. After the test soldiers have been fitted, donning and doffing exercises will be conducted with each PASGT/standard item uniform ensemble combination. Donning, doffing, and PASGT adjustment times will be recorded.

2.2.4 Data Required

a. Observations on the ability of the helmet and fragmentation armor to accommodate the test soldier while wearing the cold weather uniforms.

b. Times required to don, doff, and make adjustments to PASGT with each uniform ensemble.

2.2.5 Analytical Plan

The average donning and doffing times of PASGT will be compared with those of the standard items for significant variation at the 5 percent level. In accordance with TECOM instruction, the data and comparision results will be reported for information only.

2.3 FUNCTIONAL PERFORMANCE AND COMPATIBILITY

2.3.1 Objectives

a. Provide an evaluation of the compatibility of the PASGT with the following:

(1) All items of individual clothing (cold-wet and cold-dry uniforms, TM 10-275 and appendix F) and equipment.

(2) Standard troop type parachute assembly.

(3) Protective devices (CBR protective mask) worn or carried by the individual soldier.

(4) Individual and crew served weapons, fire control and communications equipment, vehicles, other equipment, and various mission tasks performed by the test soldier who will normally wear the PASGT.

b. Evaluate functional suitability in the accumulation of static electricity.

2.3.2 Criteria

a. The PASGT will be compatible with the cold weather uniforms to a degree that it does not impede free head movement, degrade the environmental protection provided by cold weather uniforms, and/or restrict breathing, hearing, talking, smelling, or field of vision (CRTC interpretation of para VIf(4) and (5), MN).

b. The PASGT will not interfere or hinder the user when wearing the standard troop type parachute assembly (TECOM approved, CRTC criterion).

c. The PASGT will not interfere or hinder the user when wearing or carrying CBR protective devices (TECOM approved, CRTC criterion).

d. The PASGT design should minimize or eliminate accumulation of static electricity that will actuate electrical detonating devices, or could ignite fuel/air mixtures (para VIc(2), MN).

2.3.3 Method

a. In accordance with tables 1.4.1 and 1.4.2, test soldiers (two squads, 20 personnel) will perform the exercises below while wearing the PASGT or the standard items and appropriate cold weather uniforms. In addition to the requirements of table 1.4.2, one repetition of each type of exercise, with the exception of the FTXs, will be conducted with test soldiers wearing no fragmentation protective system. The repetition will be performed to obtain training baseline data. Test soldiers will:

(1) Negotiate a Performance Comparison Course (timed exercise). The performance course will consist of five obstacles; rope slide, low wall (3 1/2 ft), high wall (6 1/2 ft), crawl through (40 in sq by 16 ft long), and a rope bridge (50 yd) (exercise A, table 1.4.1).

(2) Snowshoe 3.7 miles over snow-covered (cross-country) terrain (exercise B, table 1.4.1).

(3) Ski 5 miles over cross-country ski trails (exercise C, table 1.4.1).

(4) Participate in four field training exercises (FTX). The FTXs will consist of attack, defense, and delay operations to include patroling which will require individual soldiers of the rifle squads to use all TOE as well as fighting and existence load equipment issued for use under cold regions winter conditions. In each exercise three fire teams (15 soldiers) will be equipped with the PASGT and one fire team (5 soldiers) will be equipped with the standard items (exercise D, table 1.4.1).

(5) Participate in vehicular movement: The following tactical vehicle movement exercises will be encorporated into each FTX:

(a) A 10-mile road march cross-country in M113 tracked vehicles with test soldiers personnel occupying commander and passenger positions. Test soldiers will be required to dismount under simulated tactical conditions four times during the 10 miles.

(b) A 10-mile road marchs on secondary roads in tactical wheel vehicles with test soldiers occupying commander and passenger positions. Test soldiers will be required to dismount under simulated tactical conditions four times during the 10 miles.

(c) A 5-mile movement (skijoring) behind M116 oversnow vehicles with test soldiers being towed with their fighting and existence loads on the vehicle.

(d) Airmobile exercise (UH1H) with test soldiers being inserted in and extracted from four different LZ's/PZ's,

(6) Small arms firing exercises. The test soldiers will execute scored firing exercises using the .45 caliber pistol, M16A1 Rifle, M203 Grenade Launcher, the M60 Machinegun, and the M72, 66mm LAW (exercise E, table 1.4.1).

b. Five of the PASGT's and five standard items will be used by soldiers with the appropriate MOS and grade while performing the tasks below (not shown in table 1.4.1). Test soldiers will engage in:

(1) Artillery related tasks, e.g., ammunition handling, surveying, FDC functions, communications, and firing.

(2) Combat engineer related tasks, e.g., heavy equipment operation, demolition handling, and barrier construction.

(3) Mortar related tasks, e.g., ammunition handling, laying of guns, FDC functions, and firing.

(4) Driving tactical vehicles, e.g., M113, M116, 1/4-Ton truck, and 2 1/2-Ton truck.

c. Eight airborne soldiers will be divided into four pairs. Each pair will be considered as a group. These groups will be designated as A, B, C, and D in table 1.4.2. The table will then be employed with each test jumper wearing the ensemble that affords them the greatest comfort for the particular environmental condition prevalent at the time of the jump. Load carrying equipment, individual weapons, and showshoes will be carried during each jump. If eight airborne soldiers are not

available, the test will be performed with the qualified personnel available. If available, all jumps will be made from USAF C-130 aircraft, if the C-130 is not available, the jumps will be made from an Army UH1H aircraft.

d. At the end of each exercise in this subtest, the test soldiers will complete a compatibility questionnaire. A user evaluation questionnaire, user preference questionnaire, and vest and helmet rating forms (appendix G) will be completed by each test soldier at the end of each field exercise or each week as a minimum, and at the end of the test. The final comparative questionnaire (appendix G), provided by Hq, TECOM, will be administered one-time to test soldiers at end of testing or when a soldier is released from test participation.

e. Three static electricity measurements will be made for both the PASGT vest and the standard fragmentation armor, at ambient temperatures below -25°F using five different test soldiers. These measurements will be made prior to the conduct of other functional performance exercises in order to identify any static electric conditions that might cause actuation of electrical detonating devices or ignition of fuel/air mixtures.

(1) The following procedures will be used:

(a) A capacitance measurement, using a capacitance bridge, will be made on each test soldier. Measurements will be made at the same locations used for voltage measurements which are described in paragraph (2) below.

(b) Each soldier will then walk 50 meters.

(c) Voltage measurements will be taken as described in paragraph (2) below.

(d) Capacitance measurements will again be taken.

(2) Three different voltage measurements will be taken for each soldier and for each vest (six measurements) using an electrostatic volt meter. The measurements will be taken between the points described below.

(a) Front center of chest and palm of hand (appropriate handwear will be worn).

(b) Front center of chest and that portion of trousers covering the kneecap.

(c) Front center of chest and a 16-foot square metal plate on the ground, on which the individual is standing.

f. Upon test completion, those test and standard helmets identified as having come from USAARL, will be tagged with their use history (to include any necessary replacement components) and shipped to USAARL.

2.3.4 Data Required

a. Time required to run the performance course while wearing the PASGT and the standard items.

b. Times required to perform the snowshoeing and skiing exercises.

c. Firing exercise scores.

d. Completed compatibility questionnaires.

e. Completed user evaluation questionnaires.

f. Complete rating forms.

g. Voltages and capacitance measurements of individuals.

h. Damage due to wear, use, and environmental conditions.

i. Meteorological data at test sites.

j. Altitude, speed, and type of delivery aircraft during airborne operations.

k. Slow motion pictures of jumpers exiting the C-130 aircraft.

l. Test control personnel observations.

m. Record of environmental condition and clothing configuration for which data is collected.

2.3.5 Analytical Plan

a. Compatibility will be evaluated using the results of the compatibility questionnaire. User ratings of PASGT and standard items will be analyzed after each weekly interview administration. User ratings for PASGT vests will be compared with the ratings for the standard vests using T-test for paired comparisons at the 5 percent level. User ratings for PASGT and standard helmets will be compared by a one way analysis of variance. A least significant difference multiple comparison test will be used for multiple comparisons..

b. The criterion with respect to freedom of movement and restriction of normal functions will be evaluated by analysis of responses to the user evaluation questionnaire and observations of test control personnel. The criterion will be considered met if restrictions of normal functions and/or movement during field use are consistent with acceptable levels for body armor and personal equipment.

c. The criterion addressing compatibility with the parachute assembly will be considered met if observations of test control personnel and comments of test subjects indicate that compatibility is acceptable.

d. A detailed presentation of the subjective responses to the Hq, TECOM Questionnaire will be submitted in the final report. .

e. The criterion addressing compatibility with protective devices (CBR protective mask) will be considered met if observations of test control personnel and comments of test subjects indicate that compatibility is acceptable.

f. The criterion concerning static electricity will be evaluated by comparing the measured static electricity accumulated during testing and the static electricity discharge required to actuate electrical detonating devices and common fuel/air mixtures. The criterion will be considered met if the product of one half the capacitance times the voltage squared is below 0.5 millijoule evaluated by a T-test on a sample mean.

2.4 SAFETY AND HEALTH CHARACTERISTICS

2.4.1 Objective

Determine the degree to which the PASGT meets safety and health requirements when worn with components of the cold weather uniform.

2.4.2 Criterion

PASGT will be safe to wear with cold weather uniforms while conducting military operations under arctic winter conditions (CRTC proposed).

2.4.3 Method

a. In each functional exercise involving use of PASGT components by test soldiers, the soldier's physical condition will be observed on a

continuous basis by a qualified medical aid man (MOS 94B20). Any determination by the aid man of a safety or health hazard directly related to wear of PASGT will be immediately reported to the test officer. The test officer has the authority to curtail or locally suspend testing until evaluation of the hazard can be performed. Hazard evaluation will be performed by CRTC with assistance, if required, from Fort Greely MEDDAC professional staff. If a hazard exists that warrents formal test suspension or termination, a recommendation for such action with justification will be submitted to Hq, TECOM.

b. Testing of PASGT items by parachutists will not be initiated until receipt of a safety release.

c. Continuous monitoring of environmental conditions during the test activity period, will be the responsibility of the test officer. The test officer will insure that provisions of AR 70-25, TB MED 81, and appendix H are adhered to.

2.4.4 Data Required

a. Any accidents or hazards encountered during the test.

b. Photographs if required.

c. Test control and test personnel comments and observations.

d. Special comments concerning the suitability of the "lift dot" chin strap snap fastener and the foam nape pad for parachute operations.

2.4.5 Analytical Plan

a. The PASGT will be considered safe for use if no safety hazards are encountered during normal use and maintenance.

b. A positive statement will be included in the test report that no safety hazards were encountered or the safety hazard will be described.

2.5 HUMAN FACTORS AND TROOP ACCEPTABILITY

2.5.1 Objective

Provide an evaluation of the human factors characteristics and troop acceptability of the PASGT under cold regions winter conditions.

2.5.2 Criteria

a. PASGT must promote (by design and styling) comfort and acceptance for the wearer in the combat environment (para VIf(1), MN).

b. PASGT must permit body movement and mobility required in performance of all activities related to amphibious operations and to land combat (para VIf(2), MN).*

c. The PASGT must permit unrestricted use and operation of hand/shoulder fired or crew served weapons, fire control, and communications equipment, and vehicles or other equipment normally employed in combat at the present and in the foreseeable future (para VIf(3), MN).*

d. PASGT must cause no undue hinderance either to the senses or normal movement of the body (para VIf(4), MN).

e. PASGT must permit free head movement and not restrict breathing and talking (para VIf(5), MN).

f. PASGT must provide assurance against inadvertent opening of closures (para VId(2), MN).

g. PASGT must provide for simple and rapid means of adjustment to accomodate environmental clothing, or other protective devices and for ventilation (para VId(3), MN).

h. PASGT must have closures of durable design, location, and materiel that will permit easy opening and closing while wearing environmental handwear and in the event of injury, facilitate removal of the PASGT by another person with least possible movement of the wearer (para VId(4), MN).*

*Underlined portion will not be evaluated.

2.5.3 Method

The human factors and troop acceptability subtest will be conducted in conjunction with the compatibility and functional suitability subtest.

2.5.4 Data Required

See para 2.3.4 and para 2.6.3.4.

2.5.5 Analytical Plan

a. The criteria concerning comfort, troop acceptability, body movement, and mobility will be evaluated using the results of the user

evaluation and user preference interviews (appendix G). User ratings of PASGT and standard items will be analyzed after each weekly interview administration. User ratings for PASGT vests will be compared with the ratings for the standard vests using T-test for paired comparisons at the 5 percent level. User ratings for PASGT and standard helmets will be compared by a one way analysis of variance. A least significant difference multiple comparison test will be used for multiple comparisons.

b. Times to complete each portion of the performance course with the PASGT will be compared with the times while wearing the standard items using the T-test for paired comparisons at the 5 percent level of significance.

c. The criterion addressing operation of weapons and combat gear will be evaluated by scored range firings, observations of test control personnel, and test participant responses to the compatibility questionnaire. The criterion will be considered met if:

(1) The PASGT items are compatible with all weapons, communication equipment, clothing, and individual equipment utilized in the test.

(2) Scores on range firing by test participants are not significantly degraded by wear of the PASGT using the T-test of paired comparisons at the 5 percent level.

(3) Subjective evaluation of test soldiers responses to interview questions are not unfavorable with respect to wear of the PASGT in conjunction with combat systems utilized.

d. The criterion addressing hinderance to senses or movement of the body will be evaluated by subjective analysis of test control personnel observations and test participants' responses to the user evaluation questionnaire. The criterion will be considered met if no undue hinderance to senses or movement is noted.

e. The criterion addressing free head movement, talking, and breathing will be evaluated by subjective analysis of test control personnel observations and test participants' responses to the user evaluation questionnaire. The criterion will be considered met if no substantial adverse effects are noted.

f. The criterion addressing closures and their adjustability will be considered met if no pertinent problems are encountered during testing or determined from the subjective response of test soldiers.

2.6 MAINTENANCE EVALUATION (MAINTENANCE, PUBLICATIONS, AND STORAGE)

2.6.1 DESIGN FOR MAINTAINABILITY

2.6.1.1 Objectives

a. Determine if the design of the PASGT provides for minimal and ease of maintenance (care and cleaning) by soldiers in an cold regions environment.

b. Assess and analyze all required maintenance actions and user maintainability of the PASGT.

2.6.1.2 Criteria

a. The PASGT will require no maintenance other than normal care and cleaning by the individual (para Ve(2), MN).

b. Accessibility and ease of removal, adjustment or replacement shall be provided for all components that require periodic or frequent replacement or adjustment (para Ve(3), MN).

2.6.1.3 Method

a. All maintenance will be performed in accordance with the literature provided and will be observed and evaluated by the test officer and/or maintenance evaluator.

b. Times required to perform each maintenance action will be measured and recorded.

c. A record of any failure, adjustment, or replacement of components will be maintained amd recorded on maintenance analysis charts.

d. The PASGT will be studied and evaluated to determine design for maintainability characteristics applicable to the various levels of maintenance.

2.6.1.4 Data Required

a. All data necessary to complete the maintenance analysis chart as prescribed by TECOM Supplement 1 to AR 750-1.

b. All data necessary to assess required maintenance actions.

c. All data necessary to determine training requirements relative to individual soldier maintenance of the PASGT.

2.6.1.5 Analytical Plan

a. Data will be reviewed to determine the adequacy of design of the PASGT as prescribed by AMC PAM 706-134, to determine if the test criteria was met.

b. Each failure will be analyzed to determine if improved design would have eliminated the failure or, if repairable would have decreased the maintenance time. Suggested design changes will be reported.

c. A chargeable failure is defined as a situation whereby the PASGT or a portion of the test subsystem requires repair or replacement which cannot be accomplished by the individual user.

d. Failure definition for the test helmet are as follows (ref.1, appendix I).

(1) General: The helmet shall be removed from testing when any failure or combination of failures renders the helmet incapable of meeting its intended function of being worn in comfort and providing ballistic protection. The helmet shall remain out of the test if the failure(s) cannot be corrected by replacement of components or other means.

(2) Major: A major failure is one which cannot be corrected by test personnel and thereby causes the item to be removed from testing permanently. Such failures are as follows:

(a) Delamination of one or more layers of the shell for a distance of 2.5cm (1 inch).

(b) Specifically for the glass helmet; any break or roughness of the shell surface exposing glass fibers that cause a dermatitis during handling or wearing.

(c) Any breakdown of the suspension or chinstrap mounting holes causing the enlargement of such holes to the extent that the mounting screw no longer retains the suspension.

(3) Minor: A minor failure is one which is correctable, or tolerable and does not cause the helmet to be permanently removed from testing. Such failure would be as follows:

(a) Correctable: Damaged component (suspension, headband, or chinstrap).

(b) Tolerable: Chipping of painted surface etc.

e. Failure definition for the standard and test vest is as follows:

(1) A failure is defined as any malfunction that would prevent the vest or its components from accomplishing its intended primary function. The prime function of the vest is to provide ballistic protection from shell and grenade fragments. Those failures that would cause a degradation of ballistic efficiency or the user's ability to wear the vest are considered major and would be cause for removing the vest from test. If the vest cannot be repaired at the organizational level then it should be permanently removed from test.

(2) Types of failures which are cause for removal from test.

(a) Tear in shell of vest exposing kevlar filler (experimental vest).

(b) Inability to close the vest - closure failure (experimental and control vest).

(c) Failure of two inside side restraints, exposing sides of wearer (experimental).

(d) Tear in vinyl envelope (control).

(e) Failure of elastic laces (control).

(3) Types of failures which are not cause for removing the vest from test.

(a) Malfunction of snaps (experimental and control).

(b) Fraying of elastic side restraints and laces (experimental and control).

(c) Tear or rip in pocket of flap (experimental and control).

(d) Tear in shell of vest exposing vinyly casing (control).

(e) Loose or open seams (provided shell is not folded over)(experimental).

f. The Mean Time to Repair (MTTR) calculations will be made using the procedures outlined in TECOM Supplement 1 to AR 750-1.

g. The criteria will be considered to have been met if the PASGT can be easily maintained (care and cleaning) by the soldier in an cold

regions environment and if the PASGT demonstrates good design for ease of removal, adjustment, or replacement of all components that require periodic replacement or adjustment.

2.6.2 PUBLICATIONS

2.6.2.1 Objective

Provide an evaluation and determine the adequacy of literature for the PASGT.

2.6.2.2 Criteria

a. No special training devices will be required and training at the unit level will be accomplished with the PASGT (para VIIc, MN).

b. Publications and literature pertinent to the PASGT will be complete, accurate, easy to read, consistent in nomenclature, and simple to follow (2-5(c)(2), AR 702-3)

2.6.2.3 Method

a. All test personnel will be provided training in accordance with published training literature. This training will include the proper wear of the PASGT and standard items.

b. Observations made by the test control personnel as to the ability of the test personnel to comprehend and put to use the training provided will be recorded.

c. Any additional training required or special training device requirements will be recorded.

d. Publications and literature pertinent to the PASGT will be examined by test control personnel to determine the adequacy of composition and content. Labels, tags, etc., are considered literature and will be evaluated.

2.6.2.4 Data Required

a. All data necessary to assess the adequacy of the training literature to include the time required to train test personnel.

b. All records of observations made by the test control personnel in the test personnel's ability to comprehend the training provided.

c. Record of any additional training required or special training devices required.

d. Collected data will be relative to the degree in which the publications and literature reflect the PASGT and will identify required changes.

2.6.2.5 Analytical Plan

a. Test operations with the PASGT will be closely monitored by the test control personnel to determine training requirements. The training criterion will be considered met if there are no additional requirements for training devices.

b. The criterion regarding publications and literature will be considered met if the literature provided with the PASGT is determined to be complete, accurate, easy to read, consistent in nomenclature, and easy to follow.

2.6.3 STORAGE

2.6.3.1 Objective

Determine the effects, if any, of short term storage (24 hours or less) under cold through extreme cold conditions on the wearability of the PASGT.

2.6.3.2 Criterion

The PASGT must be able to be transported, used, and stored (short term) in climatic categories 6 through 8 as defined in AR 70-38, without reduction in operational readiness (para VIb(3), MN).*

*Underlined portion not addressed by CRTC.

2.6.3.3 Method

a. During the FTXs, five standard and five test vests will be subjected to outside storage. Upon the continuation of wear, test soldiers will be queried as to any difficulties encountered in donning the vest.

b. Specific areas of interest are as follows:

(1) Stiffening of the vest causing difficulty in donning.

(2) Functioning of the velcro front closure (vest).

(3) Functioning of the elastic side overlap webbing (vest).

(4) Functioning of snaps and/or buckles (vest and helmet).

2.6.3.4 Data Required

a. Record of meteorological conditions during storage period.

b. Record of test soldier responses on areas of interest outlined in 2.6.3.3 above.

c. Record of length of storage.

2.6.3.5 Analytical Plan

The criterion regarding short-term storage will be considered met if use of the PASGT following storage at the test temperatures reveal no detrimental effects.

2.7 VALUE ENGINEERING

2.7.1 Objectives

a. Determine whether the PASGT has any feature or components which could be improved or redesigned to increase effectiveness of the PASGT without major cost increases.

b. Determine whether the PASGT has any feature or components which could be eliminated to reduce cost without adversely affecting essential performance requirements, reliability, durability, or quality.

2.7.2 Criterion

None.

2.7.3 Method

Test supervisory personnel will record value improvement suggestions resulting from examination, observation, and use of the PASGT. User comments will also be recorded.

2.7.4 Data Required

Records of observations and comments from user and test supervisory personnel relative to the above objectives. Comments will be recorded in narrative form giving a description of the feature, recommended changes, and reasons for the recommendations.

2.7.5 Analytical Plan

None.

SECTION 3 - APPENDICES

APPENDIX A - TEST DIRECTIVE

DEPARTMENT OF THE ARMY
HEADQUARTERS, U.S. ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MARYLAND 21005

Mr. McAuley/jsr/283-3640

DRSTE-IN

3 JUN 1976

SUBJECT: Revised Test Directive for Development Test II (DTII) of Personnel Armor System for Ground Troops (PASGT), TECOM Project Nos. 8-EI-525-000-015/016/017*

Commander, US Army Aberdeen Proving Ground, ATTN: STEAP-MT-S
Commander, US Army Arctic Test Center, ATTN: STEAC-OP-PM
Commander, US Army Tropic Test Center, ATTN: STETC-OO-P

1. References.

a. Letter, AMSTE-IN, TECOM, 1 May 75, subject: Test Directive for Development Test II of Infantry Fragmentation Protective Subsystem, TECOM Project Nos. 8-EI-525-000-015/016/017.

b. RDT&E Project No. 1Y764713DL42-03/04.

c. USATRADOC ACN 18452.

d. Letter, ATCD-CS-PL, USATRADOC, 25 Apr 73, subject: Department of the Army Approved Materiel Need (MN) for a Personnel Armor System for Ground Troops (PASGT).

e. Final Report on Cost and Operational Effectiveness Analysis (COEA) on Personnel Armor System for Ground Troops (PASGT), US Army Infantry Center, Sep 75 (U).

f. Draft Coordinated Test Program for a Personnel Armor System for Ground Troops, Feb 75.

g. Independent Evaluation Plan, Personnel Armor System for Ground Troops (PASGT), Jul 75. (Incl 1)

h. Revised Test Design Plan for DT II of Personnel Armor System for Ground Troops (PASGT), dated 6 Feb 75, as revised by letter, DRXSY-RW, AMSAA, 27 Feb 76. (Incl 2)

*This letter supersedes previous test directive at reference 1a.

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i. Outline Test Plan, Personnel Armor System for Ground Troops (PASGT), 28 Jan 76. (Incl 3)

j. Letter, AMCRD-U, AMC, 21 Jan 75, subject: Single Integrated Development Test Cycle Policy.

k. Letter, AMSTE-TO-P, TECOM, 18 Jun 75, subject: Use of Non-TECOM Generated Test Data.

l. Letter, AMXHE, USAHEL, 28 Mar 74, subject: Human Factors Engineering Body Armor Systems Assessment USAHEL/USANLABS, April-May 1974.

m. Letter, STSNL-CCE, USANLABS, 15 Apr 74, subject: Human Factors Engineering Body Armor Systems Assessment USAHEL/USANLABS, April-May 1974.

n. Technical Memorandum 24-74, USAHEL, October 1974, subject: Human Factors Evaluation of Two Proposed Army Infantry/Marine Fragmentation Protective Systems (April through June 1974).

o. Letter, AMXHE, USAHEL, 13 Dec 74, subject: USA Infantry/Marine Personnel Armor System (AIMPAS) Human Factors Engineering (HFE) Cold Weather System Evaluation (CWSE) with inclosed test plan.

p. Meeting of Test Integration Working Group (TIWG) for Personnel Armor System for Ground Troops (PASGT), 20-21 Apr 76.

q. Meeting of Test Integration Working Group (TIWG) for Personnel Armor System for Ground Troops (PASGT), 7-8 Jan 76.

r. FONECON, 12 Feb 76, between CPT Allemond, USAARL, Mr. Pasini, AMSAA, and Mr. McAuley, TECOM, subject: USAARL Support Requirements for PASGT Test.

s. TECOM Supplement 1 to AR 70-32, 23 Jul 71, subject: Work Breakdown Structure for Defense Materiel Items.

t. TECOM Supplement 1 to AR 602-1, 4 Apr 73, subject: Man-Materiel Systems, Human Factors Engineering Program.

u. Security Classification Guide for Armor Materials, MSR No. 7743004, Approval Date 24 Jul 74.

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2. Background.

a. Current standard helmets and items of body armor have deficiencies in the amount of physiological stress produced, the reluctance of troops to wear items which cause discomfort, and the limited degree of protection afforded, either with respect to what munitions can be stopped or the body area coverage, or both. As a result of these deficiencies, AMC directed, in March 1970, that a comprehensive Five-Year Personnel Armor System Technical Plan be prepared for a research and development program aimed at producing an improved personnel armor system. The casualty producing capabilities of standard fragmentation and improved conventional munitions are improving rapidly and are major threats to the individual. Therefore, a need exists for a personnel armor system that will reduce the number of battlefield deaths and wounds by protecting the vital body areas against these threats. A Materiel Need (MN) for a Personnel Armor System for Ground Troops, reference 1d, was approved by Department of the Army in January 1973.

b. Under the Personnel Armor Technical Plan, a prototype fragmentation protection system, consisting of a helmet and body vest, has been developed to meet system characteristics specified in the MN. Developmental efforts have been directed toward a system which will provide greater casualty reduction potential against defined fragmentation threats with component weight equivalent to the present standard items accompanied by a reduction in weight. Improved protection is proposed to be achieved by the use of new materials. The system has been identified as a "designated non-major system" and has the US Army Natick Research and Development Command (NARADCOM) assigned with developmental responsibility.

c. The TRADOC COEA (reference 1e) concluded that only the candidate "kevlar" vest is suitable for further development. The COEA also concluded that three candidate helmets existed: (1) a 38 oz/ft^2 kevlar, (2) a 38 oz/ft^2 fiber-glass, and (3) a 30 oz/ft^2 kevlar. Formal Validation IPR for PASGT, held on 17 Dec 75 recommended that the PASGT body armor and three candidate helmets be included in DTII and OTII. The IPR recommendation was approved by DA on 20 Jan 76.

3. Description of Materiel.

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a. The prototype system consists of a torso component and three candidate helmets with nape pad and attached suspension system and chin strap described as follows:

(1) Vest, Kevlar, Fragmentation Protection:

The experimental vest covers the upper torso and consists of a ballistic filler of 14 oz/yd^2 kevlar and an inner and outer shell of surface resistant (SR) treated 8 oz/yd^2 ballistic nylon. The layer which makes up the inner shell of the vest is olive green and the layer which is the outer cover of the vest is in the camouflage colors and design. The kevlar ballistic filler in the back is made in four sections. The three upper back sections slide over each other and over the lower back section to allow for any changes in body dimensions associated with various movements. The front closure is made of velcro "touch and close" tape. The side overlaps are made flexible through the use of sewn-in 1 1/2" wide elastic webbing. The vest also has a 3/4 collar, articulating shoulder pads, two front pockets, two grenade hangers and rifle butt patches at the shoulder front area. The vest is provided in four sizes and is designed to provide increased protection and to improve the wearer's combat mobility and comfort. The vest weighs 9 lbs. in the medium size.

(2) Helmet, Kevlar (38 oz/ft^2), Fragmentation Protective:

The helmet consists of 16 plies of high tenacity, high modulus, polyamide fabric in a 2 x 2 basketweave construction. The fabric is coated with 18 to 20% phenolic/polyvinyl butyral resin. The fabric is then cut into star-shaped preforms and each ply is layed-up into a basket like construction prior to molding. The final helmet is then compression molded at approximately 2000 psi with a molding cycle of approximately 12 minutes. The helmet is one piece construction in three sizes exhibiting low profile, close fit and a low center of gravity. The design features of the helmet consist of a small brim at the front and increased head coverage over that provided by the standard helmet at the temples, ears, and neck. The helmet is designed to fit the 1st to the 99th percentile man with increased area coverage and increased protection. Weight of this helmet with attached suspension system and chin strap are as follows: small - 47 oz., medium - 49 oz., and large - 53 oz.

(3) Helmet, Kevlar (30 oz/ft^2):

This helmet is identical to the 38 oz/ft^2 kevlar candidate except that kevlar fabric of a lower density (30 oz/ft^2) is used. Weights of this helmet with attached suspension system and chin strap are as follows: small - 38 oz., medium - 40 oz., large - 43 oz.

(4) Helmet, Glass Reinforced Plastic (GRP) (38 oz/ft^2):

This helmet is of the same design and weight as the 38 oz/ft^2 kevlar helmet. The ballistic material is glass reinforced plastic fabricated from 38 oz/ft^2 Woven Roving Fiberglass which is molded and laminated with a polyester type resin.

(5) Helmet Suspension System:

The suspension system is a cradle type that is attached to the helmet with screws and threaded A-washers, which allows replacement while minimizing the amount of hardware on the inside of the helmet, thereby reducing the possibility of injury from impact. The construction is nylon with a self-compensating-drawstring type adjustment at the top. The drawstring uses a velcro tab for rapid adjustment and is sized to preclude contact of the helmet with the top of the head under all conditions. The headband utilizes velcro pile to cushion the headband clips and prevent contact with the head. The headband clips are of a new design with a positive lock to preclude release under impact. The leather covering of the headband is not sewn at the top, and overlaps the top of the sweatband itself. The chin strap utilizes pivots at the attachment point in order to provide better comfort and incorporates a new style buckle for easier adjustment. In general, the suspension system is designed to provide increased stability by having a high tension in the circumferential straps and uniform tension in the over-the-head straps; increased safety by minimizing the amount of interior hardware; and increased comfort by a combination of features of the headband and chin strap.

(6) Parachutist's Nape Pad:

A trapezoid shaped nape pad has been developed for use with the PASGT helmets. It is fabricated of 1/2" thick gray "decello" foam and is provided in one size with three sides approximately 6 inches long and the remaining side is three inches long. The pad is intended as a one-time use throw-away item.

b. Standard Items of Comparison:

(1) Body Armor, Fragmentation Protective for Neck and Torso (Std. B). The standard vest weighs 9 lbs. 4 oz. in the medium size.

(2) Helmet, Ground Troops, Steel, M1 with Liner, Ground Troops Helmet, Chin Strap, and Suspension System. The combined weight of these components is 54 oz.

4. Test Objectives.

a. Overall objective. The overall objective of the test is to determine the extent to which the subsystem components meet the characteristics specified in reference 1d, to obtain technical data responsive to the requirements of reference 1h, to compare the performance of selected characteristics of the subsystem components with those of the items to be replaced, to determine that the subsystem provides the required level of protection and possesses adequate functiona capabilities, and to develop component durability data.

b. Specific objectives.

(1) Determine the degree to which the system components meet the weight characteristics specified in reference 1d.

(2) Provide an assessment of the sizing and fitting characteristics of the system components when worn with environmental clothing (temperate and cold weather) in terms of the MN in comparison with those of the standard items.

(3) Provide an evaluation of the compatibility of the test items, in comparison with standard items, with all items of individual clothing and equipment, standard troop-type parachute assembly, and protective devices worn or carried by the individual soldier.

(4) Provide an evaluation of the compatibility of the test items with individual and crew-served weapons, fire control and communications equipment, as well as vehicles and other equipment used by personnel who will wear the subsystem.

(5) Determine the degree to which the subsystem meets the health and safety characteristics.

(6) Provide an evaluation of the human factors characteristics specified in reference 1d in comparison to the standard items.

(7) Provide an assessment of any degradation of performance due to heat stress imposed by the system.

(8) Provide an evaluation of the moisture pick-up and retention as a result of exposure to precipitation and perspiration.

(9) Determine the effect of wear and cleaning on the protective qualities of the surface-resistant (SR) treated ballistic nylon as evidenced by changes in moisture pick-up.

(10) Provide an evaluation of the camouflage and noise level characteristics in comparison with standard items as specified in reference 1d, as well as any degradation thereof as a result of normal use and cleaning.

(11) Determine the effect of CB contamination and decontamination agents and procedures.

(12) Provide an evaluation of the maintenance and training literature, ease of the individual care and cleaning, and an assessment of any unusual maintenance actions required.

(13) Thrcugh the medium of field wear, evaluate the durability characteristics to determine whether the test items can demonstrate a projected service life of one year of field use based on (120-days of wear) under tropical conditions, as specified in reference 1d and the provisions of paragraph 6 of this directive. Durability characteristics will be compared with those of the standard items.

(14) Determine the relative differences in the body area ballistic coverage between the test and standard items.

(15) Determine, by evaluation of developer-generated test data and reports, the degree to which new-condition test items meet the protective characteristics (in terms of casualty reduction) specified in reference 1d. This should include consideration of the potential inherent in the helmet design for secondary missile generation or spalling.

(16) Determine, any degradation of the protective characteristics (in terms of casualty reduction) of the test items as a result of 120 days field wear and use when compared to those of new-condition items. (See paragraph 6e).

(17) Determine and compare the impact, retention and opening shock characteristics of the test and standard helmets in new condition for use in a safety release recommendation for airborne operations. (See paragraph 6f and 7).

(18) Determine any degradation of impact, retention and opening shock characteristics of test and standard helmets following 120-days of wear in the tropic environment and after maximum accumulated wear in the arctic environment. (See paragraph 6f).

(19) Provide an evaluation of secondary injury and neck strain potential of test and standard helmets as determined by electromylogram (EMG) studies. (See paragraph 6f).

5. Responsibilities.

a. Commander, US Army Aberdeen Proving Ground (USAAPG), will plan, conduct and report such tests as are necessary to accomplish objectives in paragraph 4b(1), (2), (3), (4), (5), (6), (11), (12), (14), (15), (17) and (18).

b. Commander, US Army Arctic Test Center (USAATC), will plan, conduct and report such tests as are necessary to accomplish objectives in paragraph 4b(3), (4), (5), (6) and (12).

c. Commander, US Army Tropic Test Center (USATTC), will plan, conduct and report such tests as are necessary to accomplish objectives in paragraph 4b(3), (4), (5), (6), (7), (8), (9), (10), (12) and (13).

d. Test objectives in paragraph 4b(3), (4), (5), (6) and (12) for which addressees share responsibilities, the following will apply:

(1) USAATC and USATTC will be responsible for tests that pertain to their respective environmental conditions. With regard to paragraph 4b(3), only the USAATC and USATTC will evaluate system compatibility with standard troop-type parachute assembly.

(2) USAAPG will address these objectives based on the provisions of paragraph 6d.

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6. Special Instructions.

a. STE Form 1189, reflecting removal of test suspension and revised schedule is attached at Inclosure 10. TECOM priority code 5 applies.

b. TECOM Project Nos. are assigned as follows:

USA Aberdeen Proving Ground	8-EI-525-000-015
USA Arctic Test Center	8-EI-525-000-016
USA Tropic Test Center	8-EI-525-000-017

c. Each addressee will utilize appropriate portions of references 1f (previously furnished), 1g, 1h, 1i and this revised test directive in structuring detailed test plans. An updated CTP will be furnished by the materiel developer upon completion.

d. In connection with the policy established in reference 1j, Cdr, APG, will determine and identify through participation, monitorship, review and analysis, the extent to which developer tests and test data satisfy DT II requirements and therefore preclude the need for further evaluation during DT II. This determination will consider any component modifications that have not been evaluated by the developer. Inclosure 1 to reference 1k will be used to assist in making these determinations. Based on the review and analysis of such tests and data, plan required testing or re-testing in order to satisfy DT II requirements. Of particular concern are developer tests addressing the following characteristics: human factors evaluations, compatibility with clothing, individual equipment, weapons and vehicles camouflage, and static electrical charge. In determining those developer tests and test data that satisfy DT II requirements, APG will include a review of the test plans, data and reports of the human factors evaluations performed by the USAHEL. Some of these include references 1l, 1m, 1n and 1o which have been previously furnished USAAPG only. In those areas which require re-testing or additional testing to supplement existing data, APG will, obtain the assistance of USAHEL in this accomplishment to insure that required test procedures are common to those previously followed by USAHEL.

e. During the evaluation of the durability characteristics, the USATTC will insure that a wide range of military occupations and activities are included in this determination. Users of personnel armor, which are to be considered, are identified in Section III of reference 1d. Following the completion of the 120 days of wear, the USATTC will ship all test items, except as specified in paragraph 6f, to the developer, or other designated agency, for after-wear ballistics tests. NARADCOM has agreed to make arrangements for the conduct of after-wear ballistics tests and to convert those data to terms of casualty reduction potential. The procedures, test results and reports will be provided to HQ, TECOM for review and analysis as to any degradation of protective characteristics, in terms of casualty reduction potential, as result of 120 days of wear.

f. During meeting at reference 1p, representative of the Surgeon General agreed to furnish a statement of work covering tests to be performed by US Army Aeromedical Research Laboratory (USAARL). These tests will include evaluation of helmet impact, retention and opening shock characteristics relative to their safe use by parachutists, as well as evaluation of secondary injury and neck strain imposed by the wear of the various helmet weights. The statement of work will be furnished, upon receipt, to USAAPG for inclusion in a revised test plan.

(1) In making the determinations required in paragraph 4b(17) and 4b(18), the following actions are required based on discussions at references 1q and 1r:

(a) NARADCOM will furnish the following items to USAARL for impact, retention and open shock tests:

1. Four each candidate helmet, in medium size only, with attached suspension system and chin strap, along with 10 extra suspension systems and chin straps for each candidate and a total of four nape pads.

2. Four each standard helmet and liner with attached suspension system and chin strap, along with 10 extra suspension systems, chin straps and four nape pads.

3. Two each of the candidate and standard helmets with attached components will be drawn from quantities designated for shipment to ATC and TTC.

(b) Items listed in paragraph 6f(1) will be code marked and tested, in new condition, by USAARL for impact, retention and opening shock characteristics. USAARL will provide USAAPG with an early assessment of the test results which will support a safety release recommendation for test headgear use by parachutists.

(c) USAARL will ship two each of the experimental and standard headgear components to TTC and ATC for inclusion in the field wear planned at each test site. These items will be exposed to field wear by TTC for 120 days and by ATC for the maximum number of days possible during the test period. Following completion of field wear, these items will be returned, unrefurbished, to USAARL for after-wear testing. Should failures occur, during field wear, in suspension system, chin strap or nape pad components which require replacement, they will be replaced with a new component and the headgear continued in field wear. Upon test completion, original and replaced headgear components will be tagged with use history information prior to shipment to USAARL.

(d) USAARL will provide a letter report for inclusion in the USAAPG report covering test results on candidate and standard headgear items in new condition and after wear in arctic and tropic environments.

(2) Evaluation of secondary injury and muscle strain will be based on a proposed electro-mylogram (EMG) test. USAARL will conduct the EMG tests on test and standard headgear furnished by NARADCOM and provide a letter report to USAAPG. USAARL will be furnished with the following test item quantities which are in addition to test agency requirements:

(a) Six each 38 oz/ft^2 kevlar and GRP helmets (3small and 3 large in each helmet) with suspension system, chin strap and nape pad components.

(b) Six 30 oz/ft^2 kevlar helmets with suspension system, chin strap and nape pad components in size medium.

(c) Six standard helmets and liners with suspension system, chin strap and nape pad components.

g. Helmet and vest failure criteria, approved by PASGT TIWG at reference 1p, are attached as Inclosures 4 and 5 respectively, and will be used in classifying any failures which occur during the test.

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h. A pamphlet describing the care and use of the candidate PASGT helmets was previously provided each addressee. Additional fitting and washing instructions for the PASGT helmets are attached at Inclosure 6. Instructions for inserting parachutist's pad in the PASGT helmet are at Inclosure 7.

i. During meeting at reference 1q, representatives of the Surgeon General stated that provisions of AR 70-25, which require the use of Volunteer Participation Agreements, would be applied to this test. Representatives of the Surgeon General assisted DT II test agency project officers, during meeting at reference 1p, in preparing medical guidelines and volunteer participation agreements. A copy of the guidelines and volunteer statement for the respective addressees is attached at Inclosure 8 and will be incorporated as a medical annex to agency detailed test plans. During test plan coordination, this headquarters will submit copies of the plans to OSG for review/approval of the medical annex in light of the planned activities.

j. Revised manhour and cost estimates will be prepared in accordance with TECOM regulation 37-1. NARADCOM is in the process of transferring reimbursable funds to support test plan revision at APG and to support test execution at TTC. Reimbursable costs are based on initial estimates and revised scope of test discussed following 20-21 Apr 76 PASGT TIWG meeting. Other support for TTC and all support for ATC will be from funds normally provided. Funding for USAARL support to APG will be provided directly to USAARL by NARADCOM.

k. Test item quantities for DT II test agencies are shown below. Quantities for USAARL are discussed in paragraph 6f(1) and (2). Items are scheduled to be delivered to DT II test sites in late August 1976.

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System Components	No. Items/Test Site APG	ATC	TTC
(1) PASGT Helmet Systems:			
(a) 38 oz kevlar & GRP (20% small, 50% medium, 30% large)	50	25	50
(b) 30 oz kevlar (all size medium)	50	25	50
(2) Standard Helmet Systems (universal size)	50	25	50
(3) PASGT and Standard Body Armor (50 each)			
Small	10	5	10
Medium	24	14	24
Large	14	5	14
X-Large	2	1	2

l. This headquarters will be notified of any specific support requirements not available at the test agencies.

m. Direct coordination between the test agencies and the developer is authorized. The developer's project officer is Dr. Gregory DeSantis, USANARADCOM, Autovon 955-2537/2538.

n. Work Breakdown Structure will be prepared and used as the test plan and report subtest outline in accordance with reference 1s. TOPs will be cited in the test plans as prescribed in TECOM Regulation 70-24, and any deviations from the documented test procedures will be cited and explained when the test plans are submitted for approval.

o. Human factors evaluations will be planned and conducted in accordance with reference 1t.

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7. Safety. A developer's safety statement has been previously provided for test agency use in planning and conduct of test. As discussed in paragraph 6f, impact, retention and opening shock tests to be conducted by USAARL will provide the basis for a safety release for helmet use by parachutists. Provisions of TB MED 175 should be used as a guide in regulating troop activities when wearing personnel armor to minimize the possibilities of heat casualties. Provisions of TB MED 81 will be used as a guide in the prevention of cold injury. Proposed Volunteer Participation Agreement at Inclosure 6, which include identification of risks and precautions to be taken, will be utilized also in test planning and execution.

8. Test Plans and Reports.

a. Revised test plans will be prepared in accordance with TECOM Regulation 70-24, dated 7 Mar 74, and seven copies submitted to this headquarters for approval by 2 August 1976.

b. Formal test reports will be submitted in 10 copies to this headquarters for approval as follows: USAATC - 15 Jun 77, USAAPG - 15 Jul 77, and USATTC - 15 Oct 77.

c. Equipment performance reports (EPRs) will be prepared in accordance with DARCOM Regulation 700-38 and TECOM Supplement 1 with change 1.

d. Distribution of plans, reports and EPRs will be in accordance with the revised distribution list at Inclosure 9.

9. Coordination.

a. Draft test plans will be informally coordinated with the agencies listed below prior to submission to this headquarters for approval. Test agencies will request that coordinating agencies also provide this headquarters with a copy of their test plan comments.

(1) Cdr, US Army Natick Research and Development Command, ATTN: DRXNM-EPT.

(2) Cdr, US Army Training and Doctrine Command, ATTN: ATCD-CS.

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(3) Comdt, US Army Infantry School, ATTN: ATSH-I.

(4) Cdr, US Army Operational Test and Evaluation Agency, ATTN: DACS-T-EO.

(5) Dir, US Army Materiel Systems Analysis Activity, ATTN: DRXSY-M and DRXSY-RW.

(6) Cdr, US Army Logistics Evaluation Agency, ATTN: DALO-LEI.

(7) Cdr, US Army Logistics Center, ATTN: ATCL-M (3 copies).

(8) Cdr, US Army Combat Developments Activity (Alaska), ATTN: ATCA-AL (USAATC plan only).

(9) Each addressee.

b. Three copies of the draft test plans will be provided to this headquarters when the plans are submitted for coordination. TECOM will submit all plans as a package to OSG for review/approval of the medical annex.

10. Security. The physical and performance characteristics to be addressed in this project are unclassified. The protection (casualty reduction potential) characteristics of the test items are classified CONFIDENTIAL, reference 1u, previously furnished, and will not be addressed in the USAAPG, USAATC or USATTC test reports. Protection characteristics will be addressed in a separate report prepared by the developer and submitted to TECOM for review.

FOR THE COMMANDER:

John M. Milton

JOHN M. MILTON
Colonel, GS
Dir, Inf & Trp Spt Mat Test

10 Incl
1. Indep Eval Plan
2. Revised Test Design Plan
3. Outline Test Plan
4. Helmet Failure Criteria
5. Vest Failure Criteria
6. Helmet Fitting & Washing Instr
7. Parachutist's Pad Instr
8. Volunteer Participation Agreement
9. Revised Distribution List.
10. STE Form 1189

DRSTE-IN 3 JUN 1976

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CF: (w/o incl)
Cdr, NARADCOM, ATTN: DRXNM-EPT
Cdr, TRADOC, ATTN: ATCD-CS
Cmdt, USAIS, ATTN: ATSH-I
Cdr, OTEA, ATTN: DACS-T-EO
Dir, AMSAA, ATTN: DRXSY-M, DRXSY-RW
Cdr, LEA, ATTN: DALO-LEI
Cdr, USA Log Center, ATTN: ATCL-M
Cdr, USACDA (Alaska), ATTN: ATCA-AL
Dir, USAHEL, ATTN: DRXHE
Cdr, ARIEM, ATTN: SGRD-VE-ME
OSG, ATTN: DASG-RDZ-HA
HQDA, ATTN: SGRD-EDE
Cdr, USAARL, ATTN: SGRD-UAE
USMC LnO, TECOM
TRADOC LnO, TECOM

APPENDIX B - TEST CRITERIA AND CRITICAL ISSUES

SECTION 1. TEST CRITERIA

Item	Source	Criteria	Applicable Subtest	Remarks
1.	Para VId(1), MN	The PASGT must permit easy donning and doffing.	2.2	
2.	CRTC interpretation of para VIf(4) and (5), MN	The PASGT will be compatible with the cold-dry uniform to a degree that it does not impede free head movement and will not restrict breathing, hearing, talking, smelling, or field of vision.	2.3	
3.	CRTC Criterion TECOM Approved	The PASGT will not interfere or hinder the user when wearing standard troop-type parachute assembly.	2.3	
4.	CRTC Criterion TECOM Approved	The PASGT will not interfere or hinder the user when wearing or carrying CBR protective devices.	2.3	
5.	Para VIc(2), MN	The PASGT design should minimize or eliminate accumulation of static electricity that will actuate electrical detonating device, or could ignite fuel/air mixtures.	2.3	

Item	Source	Criteria	Applicable Subtest	Remarks
6.	CRTC Proposed	The PASGT will be safe to wear with cold weather uniforms while conducting military operations under cold regions winter conditions.	2.4	
7.	Para VIf(1), MN	The PASGT must promote (by design and styling) comfort and acceptance for the wearer in the combat environment.	2.5	
8.	Para VIf(2), MN	The PASGT must permit body movement and mobility required in performance of all activities related to amphibious operations and land combat.*	2.5	
9.	Para VIf(3), MN	The PASGT must permit unrestricted use and operation of hand/shoulder fired or crew served weapons, fire control and communications equipment, and vehicles or other equipment normally employed in combat at the present and in the foreseeable future.*	2.5	
10.	Para VIf(4), MN	The PASGT must cause no undue hinderance either to the senses or normal movement of the body.	2.5	
11.	Para VIF(5), MN	The PASGT must permit free head movement and not restrict breathing and talking.	2.5	

*Underlined portions will not be evaluated by CRTC.

Item	Source	Criteria	Applicable Subtest	Remarks
12.	Para VId(2), MN	The PASGT must provide assurance against inadvertant opening of closures.	2.5	
13.	Para VId(3), MN	The PASGT must provide for simple and rapid means of adjustment to accommodate environmental clothing or other protection devices and for ventilation.	2.5	
14.	Para VId(4), MN	The PASGT must have closures of durable design, location, and material that will permit easy opening and closing while wearing environmental handwear and, in the event of injury, facilitate removal of the PASGT by another person with least possible movement of the wearer.*	2.5	
15.	Para Ve(2), MN	The PASGT will require no maintenance other than normal care and cleaning by the individual.	2.6	
16.	Para Ve(3), MN	Accessibility and ease of removal, adjustment, or replacement shall be provided for all components that require periodic or frequent replacement or adjustment.	2.6	

*Underline portions will not be evaluated by CRTC.

Item	Source	Criteria	Applicable Subtest	Remarks
17.	Para VIIc, MN	No special training devices will be required and training at the unit level will be accomplished with the PASGT.	2.6	
18.	Para 2-5(c)(2) AR 702-3	Publications and literature pertinent to the PASGT will be complete, accurate, easy to read, consistent in nomenclature, and easy to follow.	2.6	
19.	Para VIb(3), MN	The PASGT must be able to be transported,* used, and stored (short-term) in climatic categories 5 through 8 as defined in AR 70-38, without reduction in operational readiness.	2.6	

*Underlined portions will not be evaluated by CRTC.

SECTION 2. CRITICAL ISSUES

NONE

APPENDIX C - SUPPORT REQUIREMENTS

PERSONNEL

The following personnel are required at the Cold Regions Test Center:

Job Title	Grade	MOS	No. Required	Status
Test Officer	03	2040	1	Perm Party
Senior Test NCO	E7	11B40	1	Perm Party
Test NCO	E7	11B40	1	Perm Party
Data Collector	E4	NA	1	Perm Party
Squad Leaders	E6	11B4P/11B40	2	TDY
Infantrymen	E3/E4	11B20	9	TDY
Infantrymen	E3/E4	11B2P	9	TDY
Medical Aidman	E4/E5	91B20	1	TDY

MATERIEL

The following materiel is required at the Cold Regions Test Center:

	Amount	Status
Personnel Armor System Ground Troop	25	NARADCOM
Standard Steel Helmet	25	NARADCOM
Standard Armored Vest	25	NARADCOM

SUPPORT ITEMS

Cold-dry Uniform w/Standard A (Nylon (quilted liners)	30	NARADCOM
Loadcarrying Equipment (ALICE)	25	NARADCOM
180-Day Maintenance Package for:		NARADCOM
Test item		
Comparison item		
(Package should include extra chin straps, head harness components, thread, snaps, and buckles.)		
Weapons, Ammo, and Special Equipment		
M60 Machinegun	2	CRTC
Cartridge, 5.56mm, Ball, Rds	10,000	CRTC
Cartridge, 5.56mm, Blank, Rds	3,000	CRTC
Cartridge, 7.62mm, Linked, M80, Rds	13,000	CRTC
Cartridge, 7.62mm, Blank, Linked, Rds	3,000	CRTC
Cartridge, .45 Cal, Ball	4000	CRTC
Cartridge, 40mm	400	CRTC
LAW, M-72	60	CRTC
Ahkio and Squad Load Complete	3	CRTC
1-Ton Sled	2	NWTC

	Amount	Status
Aircraft: UH-1H, Flight time in hours	50	CRTC
C-130, Fight time in hours	4	USAF
Tactical Vehicles:		
APC, M113, w/driver	3	CRTC
Vehicle, Oversnow, M116 w/drivers	2	CRTC
Truck, 2 1/2-ton w/PC Kit, w/drivers	2	CRTC
Truck, 1/4-ton	1	CRTC
Communications: AN/PRC-77	3	CRTC
Instrumentation:		
Stopwatches	5	CRTC
Thermometer	4	CRTC
Static Electricity Meter	1	CRTC
Medical: Ambulance	1	CRTC
Meteorological Support: Normal data with as required MET Team snow class periodically		
Support Requirements from CO, HQ CO, CRTC:		
Inprocessing, housing, messing, recreation for 21 TDY soldiers	21	FORSCOM
Photographic Support: ID and EPR		
Film, 16mm MP, Color, ft	1000	CRTC
Film, 8 x 10 ID photos, Color, ea	10	CRTC
Film, 8 x 10 ID photos, B/W, ea	10	CRTC
Film, 4 x 5, Misc photos of test, B/W, ea	30	CRTC
Film, 4 x 5, Misc photos of test, Color, ea	30	CRTC
Film, Video with camera, low light level, ea	5	CRTC
Supply, POL, and Other:		
LAW, expended	2	CRTC
Binoculars, M17A1	3	CRTC
Snowshoes, w/Bindings, pair	25	CRTC
Skis, w/Bindings, pair	25	CRTC
Rifle, M16A1	16	CRTC
Launcher, Grenade, M203	4	CRTC
Pistol, cal .45 w/(4)Holster	20	CRTC
DF 2A (gal)	1400	CRTC
MOGAS (gal)	440	CRTC
Adapter, Blank, M16	20	CRTC
Adapter, Blank, M60 Machinegun	2	CRTC
Overwhite, set	30	FORSCOM

APPENDIX D - TEST SCHEDULE

X = Test item delivery date

Name of Subtest	Time Increments (Months) X	X+1	X+2	X+3	X+4
Preoperational Inspection	=====				
Sizing and Fitting	=======				
Functional Performance and Compatibility	==========	==========	==========		
Maintenance, Publications, and Storage	==========	==========	==========		
Human Factors and Troop Acceptability	==========	==========	==========		
Safety and Health Characteristics	==========	==========	==========		
Value Engineering	==========	==========	==========		

APPENDIX E - INFORMAL COORDINATION

1. This test plan was coordinated with the following agencies:

a. Commander
U.S. Army Natick Research and Development Command
ATTN: DRXNM-EPT (Mr. Bill Boardman)
Natick, MA 01760

b. Director
U.S. Army Materiel Systems Analysis Activity
ATTN: DRXSY-M (Mr. Peasini)
Aberdeen Proving Ground, MD 21005

c. Commander
U.S. Army Test and Evaluation Command
ATTN: DRSTE-IN (Mr. McAuley)
Aberdeen Proving Ground, MD 21005

2. Coordination comments and CRTC responses are as follows:

a. U.S. Army Natick Research and Development Command.

(1) Page 6, paragraph 1.4f(4) - CRTC proposed operational mode should be described. (Accommodated)

(2) Page 9, paragraph 2.1.3b - Caution to the test center: Since the three types of helmets are identical in shape and since the identification of the type of helmet is on the shipping containers only, it is essential that the helmets be coded immediately after unpacking. (Accommodated)

(3) Page A-13, Appendix A, paragraph 6k(3) - PASGT and Standard Body Armor - Change to Read:

Small	14	6	14
Medium	22	10	22
Large	12	8	12
X-Large	2	2	2

(Accommodated)

b. U.S. Army Test and Evaluation Command

(1) Page 6, paragraph 1.4f(4) - Identification of the components of ensemble 4 should be included. (Accommodated)

(2) Page 7, table 1.4.1 - This table is not considered adequate to address ensemble and armor combinations for the exercises shown, in consideration of the time, equipment combination, and activity factors. (Accommodated)

(3) Page 7, table 1.4.1, footnote 1 - A standard cold-wet uniform is not that identified in the TDP as shown in paragraph 1.4F(1) and is not expected to provide environmental protection in temperatures as low as -20°F. (Accommodated)

(4) Page 7, table 1.4.1, footnotes 2 and 3 - Temperature ranges shown in these footnotes should be the same for the cold-dry uniform. (Accommodated)

(5) Page 10, paragraph 2.2.5 - Due to the variability that can be expected in time measurements of this nature, the data for standard and PASGT time measurements of this nature, the data for standard and PASGT systems should be compared and reported for information only. (Accommodated)

(6) Page 12, paragraph 2.3.3a(7) - Delete in its entirety, this activity is not adequate to evaluate the uniform/armor combination which AMSAA will require be included in the FTX (see para b above). (Accommodated).

(7) Page 14, paragraph 2.3.3 - Add a paragraph indicating actions planned to comply with requirements of paragraph 6f, Appendix A, and paragraph 5 and 6, reference 8, as they apply to USACRTC. (Accommodated)

(8) Page 15, paragraph 2.4.3 - This paragraph will be expanded to include the following: "testing of PASGT items by parachutists will not be initiated until receipt of safety release. Continuous monitoring of environmental conditions, during test activity periods, will be the responsibility of the assigned test officer, the test officer will insure that provisions of AR 70-25, TB MED 81, and appendix H are adhered to." (Accommodated)

(9) Page E-1 - Delete addressees in paragraph B, D, E, F, G, and H, coordination with these agencies will be accomplished by TECOM approval. (Accommodated)

(10) Page H-4, paragraph d, line 10 - Delete "rain" and substitute "range". (Accommodated)

(11) Page I-1 - Add references for AR 70-25 and TB MED 81. (Accommodated).

c. U.S. Army Materiel Systems Analysis Activity

(1) As was discussed in previous Fonecons....
the test plan deviates from the TDP prepared by this activity. The need to reduce the scope of the CRTC phase of DT II so that it may be accomplished in one winter season is recognized; however, the reduction as indicated by table 1.4.1 of the test plan is so great as to preclude an adequate assessment of PASGT with the various clothing ensembles and tasks indigenous to cold regions. Therefore, table 1.4.1 of the draft test plan should be ammended to conform to the following performance matrix:

	Uniform Ensemble			
Exercise	Cold-Wet (1)	Cold-Dry (2)	172d (3)	CRTC (4)
A	X	X	X	X
B		X		X
C	X		X	
D	X	X	X	X
E	X		X	

Considerations will be given to eliminating exercises B and C (snowshoe and ski) of the above table if these tasks can be incorporated into an expanded FTX (exercise D). Note that exercise F (stationary) has been deleted. (Accommodated)

(2) It is not understood why ensemble 2, standard cold-dry uniform will only be worn below -40°F as indicated on page 7 of the test plan. Ensemble 2 and 3, both variations of the standard cold-dry uniform, should be used under the same environmental conditions. In addition, the standard cold-wet uniform identified in footnote 1 of page 7 should be replaced with the hybrid cold-wet ensemble as defined in paragraph 1.4.f(i) of page 6. (Accommodated: CRTC agrees the temperature ranges for cold-dry ensemble modes should be consistant. These ranges have been changed to "from 0°F to the lowest temperature available". The 0°F temperature has been chosen, based on CRTC experience, as an average lower bound for safe wear of the cold-wet uniform).

(3) The CRTC optional uniform, identified as ensemble 4, needs to be further defined as what configuration it consists of.. (Accommodated)

(4) The vest and helmet rating forms, pages G-7 and G-8 should be ammended to include a line labeled "system designation code" under the "name" line. (Accommodated)

3. The following TECOM comments and CRTC responses were included in the plan prior to publication:

a. Page 6, para 1.4f(3) - Delete "(as worn by 172nd Bde)". (Accommodated).

b. Page 7, Table 1.4.1 - For ensemble 3 in body of table and footnote: Delete references to ensemble as worn by 172nd Bde. (Accommodated).

c. Page 13, para 2.3.3e - This paragraph will show that static electricity measurements will be made prior to conducting other functional performance tests. This will be done to identify any possibilities of actuation of electrical detonating devices, or ignition of fuel/air mixtures. (Accommodated).

d. Analytical plans throughout the test plan should be structured so that comparisons may be made between all helmet/vest combinations. Instead of using t-tests as stated in paras 2.3.5 and 2.5.5, a one-way analysis of variance plus an appropriate multiple comparison method should be used to compare PASGT items with each other and with the standard item. Analytical plans should indicate that the analysis will be computed after each interview administration. (Accommodated).

e. Throughout the plan, Data Required paragraphs indicate test team observations as a data source. The plan should indicate a means for systematic recording of these observations. (Accommodated).

f. Appendix G, pages G-3 and G-4, questions 1 and 2 respectively - Add a subquestion to obtain a rating for fit of the vest and helmet. (Accommodated).

g. Safety subtests in each plan will be expanded to show the specific medical supervision, authority and responsibility established to control or terminate test activities. (Accommodated).

h. That portion of the medical annex in each plan which is the Human Test Volunteer Participation Agreement will be deleted in its entirety. (Accommodated).

i. Page 8, para 1.4h: Delete in its entirety and substitute "The medical protocol at appendix H has received concurrence from the Office of the Surgeon General and will be used as part of the test participant orientation. Participants will be fully informed as to the nature of test activities, data to be collected, potential hazards associated with adverse environments and the precautions to be taken by the test agency." (Accommodated).

j. An additional questionnaire, prepared by HQ, TECOM for use by DT II test agencies to permit an overall comparison of subjective opinions has received the concurrence of U.S. Army Materiel Systems Analysis Activity, the independent evaluator, and is forwarded for use by each test agency. The questionnaire will be reproduced by test agencies for a one-time administration at the end of testing or when a test soldier is released from test participation. A detailed presentation of the subjective responses to this questionnaire will be included in each agency final report. (Accommodated).

APPENDIX F - COLD WEATHER UNIFORMS AND SUPPLEMENTAL EXISTENCE LOAD, AND AHKIO LOAD

COLD WEATHER UNIFORMS

The yearround temperature variation peculiar to the cold regions prohibits the prescribing of a particular uniform for any season. The clothing which is comfortable at -50°F becomes uncomfortable at -10°F, and vice versa. Since a large fluctuation is experienced on an hour-by-hour, day-by-day basis, some degree of flexibility in uniform requirements is necessary.

The cold-wet uniform is designed to afford maximum protection against the hazards of changing temperatures, rain, wet snow, mud, and slush of a cold-wet environment.

The cold-dry uniform is designed to provide protection against the hazards of extreme temperatures, high winds, and snow of a cold-dry environment. As indicated below, the cold-wet uniform is part of the cold-dry uniform. The cold-wet uniform provides the inner insulating components of the cold-dry uniform. Progressing from cold-wet to cold-dry is accomplished by adding more insulation in the form of additional outer garments.

The necessary clothing components of the cold weather uniforms are worn as defined in TM 10-275, DA, Cold Weather Clothing and Sleeping Equipment, dated April 1968.

Item	Cold-Wet	Cold-Dry
a. Undershirt man, cotton, wool, full sleeve.	X	X
b. Drawers man, cotton, wool, knit, ankle length.	X	X
c. Socks mans, wool, cushion sole, OG 408, stretch type.	X	X
d. Suspenders trousers, scissor back type.	X	X
e. Shirt mans, wool, nylon, flannel, OG 108.	X	X
f. Trousers, mans wool serge, OG 108.	X	
g. Trousers mans, cotton nylon sateen, OG 107	X	X
h. Trousers, mans, cotton nylon, OG 107, arctic.		X
i. Liner trousers, nylon quilted, 6.2 oz, OG 106.		X

Item	Cold-Wet	Cold-Dry
j. Liner, trousers, arctic, nylon quilted 6.2 oz, white		X
k. Boot insulated cold weather, mans rubber white w/release valve.		X
*l. Boot, insulated, cold weather, mans rubber, black, w/release valve.	X	
m. Coat mans, cotton and nylon wind resistant sateen, OG 107.	X	X
n. Liner coat mans, nylon quilted, 6.2 oz, OG 106.	X	X
o. Parka mans, extreme cold weather, nonreversible, OG 107, wo/hood.		X
p. Liner parka mans, nylon quilted, 6.2 oz, OG 106.		X
q. Cap, insulating helmet, liner helmet, cotton nylon, OG 107.	X	X
r. Hood winter, cotton and nylon oxford, OG 107, w/drawcord and fur ruff.		X
s. Handwear:		
(1) Mitten set arctic: Gauntlet style shell w/leather palm.	X	X
**(2) Mitten shells: Trigger finger leather palm and thumb with wool inserts.	X	X
**(3) Glove shells, work, leather with wool inserts.	X	X
(4) Gloves cloth, work type (anticontact)	X	X
t. Special purpose clothing items:		
(1) Over white uniform components.	X	X
(2) Mask: Extreme cold weather, nylon, and rayon felt.	X	X
(3) Dickey, rayon, OD (local item of issue)	X	X
(4) Balaclava, wool, navy blue (local item of issue)	X	X

*Not available to CRTC.
**Items not worn at same time.

TYPICAL COLD REGIONS FIGHTING LOAD, AND EXISTENCE LOADS, SUPPLEMENTAL LOAD AND AHKIO LOAD

The following items should be carried or worn by all personnel during winter months while conducting cold regions winter operations.

The typical cold regions fighting and existence load may be modified to include new items of equipment and tailored to meet the tactical scenario.

1. Fighting Load (carried on the person):

Item	Quantity
Cap, insulating, helmet liner/helmet	1
Helmet w/liner and camouflage cover	1
Undershirt, 50/50	1
Undershirt, cotton	As desired
Drawers, 50/50	1
Drawers, cotton	As desired
Socks, cushion sole	1
Suspenders, trousers	1
Trousers, cotton nylon, WR	1
Shirt, wool, OG 108	1
Boots, insulated	1
*Coat, cotton/nylon, w/liner	1
*Parka	1
Liner, parka	1
Hood, winter	1
Muffler, wool	1
Mitten, set, arctic	1
Mitten, shell, trigger finger	1
Inserts, mitten, TF	1
Overwhites, set	1
Body armor	1
Individual weapon	1
**Skis w/poles	1
**Snowshoes	1
Grenade, M26A2	
Bayonet w/scabbard	1
Canteen, arctic (full), w/cover and cup	1
Belt w/first aid packet and pouch	1
Pouch, ammo, w/ammo	2
Suspenders, pack, cbt	1
Protective Mask	1
Lipstick, antichap, cold climate	1
Sunglasses w/case	1
Box, match, waterproof w/matches	1
Personal items (i.e., cigarettes, matches, notebook, pencil, etc.)	As desired

*Either coat or parka or both depending upon temperature.
**One or the other but not both. Ski wax carried by two members of the team.

2. Existence Load (carried in rucksack):

Item	Quantity
Rucksack	1
Socks, cushion sole	2
Liner, trousers	1
Inserts, mitten, TF	1
Bag, sleeping, mtn	1
Bag, sleeping, arctic	1
Case, water repellent	1
Bag, waterproof	1
Mattress, pneumatic	1
Poncho	1
C-rations	1
Toilet articles	1
Towel, turkish	1
Strap, natural color	1
Face mask, arctic	1
*Climbers, ski	1
Intrenching tool w/cover	1

*For personnel wearing skis.

3. Supplemental Existence Load:

The following items are not immediately needed by the individual. They are normally carried in the duffle bag on unit transportation, and should be available when needed:

Item	Quantity
Undershirt, 50/50	1
Drawers, 50/50	1
Socks, cushion sole	3
Trousers, cotton nylon, WR	1
Shirt, wool, OG 108	1
*Parka, cotton nylon	1
*Liner, parka, nylon quilted	1
*Coat, cotton nylon	1
*Mitten, set, arctic	1
*Mitten, shells, trigger finger	1
Skis w/poles, climbers, and wax, or snowshoes	1

*Temperature at time of mission will determine which of these items are worn, and which are carried in the supplemental load.

4. Ahkio Load:

a. Tent Group Equipment: A tent group is normally a squad size unit but may contain only the members of a tank crew or comparable size unit i.e., platoon or company, Cp or FDC.

b. The following is the tent group equipment for an infantry squad (10 EM):

Item	Quantity
Ahkio (200-pound sled)	1
Ten-man tent	1
Yukon stove	1
Five gallon gasoline can (filled)	1
Five gallon water can (filled)	1
Cases of C rations	2
120-foot climbing rope	1
Gasoline lantern	1
Box of candles	1
Squad cook sets	2
One burner squad stoves	2
Axe	1
Saw (Buck or Swede)	1
Machete w/sheath	1
D handle shovel	1
Ski repair kit	1

APPENDIX G - QUESTIONNAIRES

INTERVIEW QUESTIONS - COMPATIBILITY

NAME _____ SSAN _____ DATE _____
TEST COURSE _____ TEMP _____ RANK _____
CLOTHING _____ EQUIPMENT USED _____ WIND _____

Use the following rating for all questions (enter number).

6 - Excellent
5 - Very Good
4 - Adequate
3 - Not Quite Adequate
2 - Poor
1 - Extremely Poor

1. Compatibility of the vest.

a.____ How would you rate the ease of using the vest and parka together?

How would you rate the ease of using the following equipment while wearing the vest:

b.____ Skies?

c.____ Snowshoes?

d.____ Individual weapon?

e.____ Crew served weapon?

f.____ Vehicles?

g.____ Mortar?

h.____ Artillery?

i.____ Parachute?

j.____ Shovel?

k.____ Knife and fork?

l.____ Latrine (BM)?

m.____ Axe?

n.____ Backpack?

o.____ Protective Mask?

2. Compatibility of the helmet.

a.____ How would you rate the ease of using the helmet and insulated cap together?

b.____ Binoculars?

c.____ Glasses and sunglasses?

d.____ Night vision goggles?

e.____ Goggles?

f.____ Vehicles?

g.____ Radio?

h.____ Individual weapon?

i.____ Crew served weapon?

j.____ Mortar?

k.____ Artillery?

l.____ Parachute?

m.____ Telephone?

n.____ With protective mask, cold weather?

COMMENTS:_____

_____

_____

_____

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INTERVIEW QUESTIONS - USER EVALUATION

NAME_____ SSAN_____ DATE_____
RANK_____
TEST COURSE_____ TEMP_____ WIND_____
CLOTHING_____ EQUIPMENT USED_____

Use the following ratings for all questions (enter number).

6 = Excellent.
5 = Very Good.
4 = Adequate.
3 = Not Quite Adequate.
2 = Poor.
1 = Extremely Poor.

1. How would you rate the comfort of the vest while:

____ Walking? ____ Running? ____ Riding?
____ Driving? ____ Lying down? ____ Sitting?
____ Skiing? ____ Climbing?

a.____ How would you rate the ease of arm movement while wearing the vest?

b.____ How would you rate the ease of body movement while wearing the vest?

c.____ How would you rate the warmth of the vest while resting?

d.____ How would you rate the heat ventilation of the vest when active?

e.____ How would you rate the ease of putting on the vest?

f.____ How would you rate the ease of adjusting the vest?

g.____ How would you rate the ease of removing the vest?

h.____ How would you rate the ease of cleaning the vest?

i.____ How well could you breathe while wearing the vest while active?

j.____ How would you rate the overall fit of the vest?

COMMENTS: _____

2. How would you rate the comfort of the helmet while:

____ Walking?	____ Running?	____ Crawling?
____ Lying down?	____ Eating?	____ Sitting?
____ Skiing?	____ Climbing?	

a.____ How would you rate the ease of head movement while wearing the helmet?

b.____ How would you rate the range of vision allowed by the helmet?

c.____ How would you rate the warmth of the helmet while resting?

d.____ How would you rate the heat ventilation of the helmet when active?

e.____ How would you rate the ease of putting on the helmet?

f.____ How would you rate the ease of adjusting the helmet?

g.____ How would you rate the ease of removing the helmet?

h.____ How would you rate the ease of cleaning the helmet?

i.____ How well could you hear with the helmet on?

j.____ How well could you talk with the helmet on?

k.____ How would you rate the fit of the helmet?

COMMENTS: _____

_____

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_____

_____

INTERVIEW QUESTIONS - USER PREFERENCE

NAME_____ SSAN_____ DATE_____
RANK_____
TEST COURSE_____ TEMP_____ WIND_____
CLOTHING_____ EQUIPMENT USED_____

1. While performing each of the following tasks, which VEST did you prefer?

	Test	Standard	Why?
1. Skiing.			
2. Snowshoeing.			
3. Firing individual weapons.			
4. Firing crew served weapons.			
5. Riding or driving vehicles.			
6. Participating as a member of a mortar crew.			
7. Participating as a member of an artillery crew.			
8. Parachute jump.			
9. Digging with a shovel.			
10. Using a knife and fork.			
11. Using a latrine (BM).			
12. Using an axe.			
13. Backpacking.			
14. Walking.			
15. Running.			
16. Lying down.			
17. Sitting.			
18. Climbing.			

DATE_____

NAME_____ SSAN_____ RANK_____

TEST COURSE_____ TEMP_____ WIND_____

CLOTHING_____ EQUIPMENT USED_____

2. While performing each of the following tasks, which HELMET did you prefer?

	Test	Standard	Why?
1. Using binoculars.			
2. Wearing glasses/sunglasses.			
3. Using night vision goggles.			
4. Wearing regular goggles.			
5. Riding or driving vehicles.			
6. Operating a radio.			
7. Firing individual weapons.			
8. Firing crew served weapons.			
9. Participating as a member of a mortar crew.			
10. Participating as a member of an artillery crew.			
11. Parachute jump.			
12. Using a telephone.			
13. Walking.			
14. Running.			
15. Crawling.			
16. Lying down.			
17. Eating.			
18. Sitting.			
19. Skiing.			
20. Climbing.			

VEST RATING FORM

SUBJECT GROUP_____ CONDITION_____

NAME_____ SUBJECT NO._____ DATE & TIME_____

SYSTEM DESIGNATION CODE _____

	EXTREME	MODERATE	SLIGHT	EQUAL TO STANDARD B	SLIGHT	MODERATE	EXTREME	
HOT	0	0	0	0	0	0	0	COOL
TIGHT	0	0	0	0	0	0	0	LOOSE
STABLE	0	0	0	0	0	0	0	WOBBLY
HEAVY	0	0	0	0	0	0	0	LIGHT
SLIPS	0	0	0	0	0	0	0	CLINGS
BALANCED	0	0	0	0	0	0	0	UNBALANCED
COMFORTABLE	0	0	0	0	0	0	0	UNCOMFORTABLE
PROTECTIVE	0	0	0	0	0	0	0	UNPROTECTIVE
EXPOSES	0	0	0	0	0	0	0	COVERS
FLIMSY	0	0	0	0	0	0	0	SOLID
RIGID	0	0	0	0	0	0	0	FLEXIBLE
BULKY	0	0	0	0	0	0	0	TRIM
MOVES FREELY	0	0	0	0	0	0	0	BINDS
STAYS DOWN	0	0	0	0	0	0	0	RIDES UP
SLOPPY	0	0	0	0	0	0	0	NEAT
GOOD LOOKING	0	0	0	0	0	0	0	UGLY
FOREIGN	0	0	0	0	0	0	0	AMERICAN
MILITARY	0	0	0	0	0	0	0	NONMILITARY

HELMET RATING FORM

SUBJECT GROUP_____ CONDITION_____

NAME_____ SUBJECT NO._____ DATE & TIME_____

SYSTEM DESIGNATION CODE_____

	EXTREME	MODERATE	SLIGHT	EQUAL TO M-1	SLIGHT	MODERATE	EXTREME	
NECESSARY	0	0	0	0	0	0	0	UNNECCESSARY
TIGHT	0	0	0	0	0	0	0	LOOSE
GOOD LOOKING	0	0	0	0	0	0	0	UGLY
STRONG	0	0	0	0	0	0	0	WEAK
SLIPS	0	0	0	0	0	0	0	CLINGS
COMFORTABLE	0	0	0	0	0	0	0	UNCOMFORTABLE
USEFUL	0	0	0	0	0	0	0	USELESS
NEAT	0	0	0	0	0	0	0	SLOPPY
LARGE	0	0	0	0	0	0	0	SMALL
PROTECTIVE	0	0	0	0	0	0	0	UNPROTECTIVE
HOT	0	0	0	0	0	0	0	COOL
GRIPS	0	0	0	0	0	0	0	SLIDES
STABLE	0	0	0	0	0	0	0	WOBBLY
VALUABLE	0	0	0	0	0	0	0	WORTHLESS
HEAVY	0	0	0	0	0	0	0	LIGHT
SAFE	0	0	0	0	0	0	0	UNSAFE
SHARP	0	0	0	0	0	0	0	DULL

FINAL COMPARATIVE QUESTIONNAIRE

Personnel Armor for Ground Troops (PASGT)

I. BASIC DATA

NAME:_____ DATE:_____
(First) (MI) (Last) (Day) (Month) (Year)

MOS:_____ ORGANIZATION/UNIT:_____

TEST LOCATION: (Check one) TTC (Tropic) ☐ CRTC (Arctic) ☐ APG ☐

TEST ITEMS WORN: (Check) Vests: PASGT ☐ Helmets: P-1 ☐
STD-B ☐ P-2 ☐
P-3 ☐
STD-M-1 ☐

II. INSTRUCTIONS

Please answer the following questions by indicating the response which you feel best represents your opinion of the personnel armor systems worn during the test. You are urged to make any additional comments or suggestions which you feel may be helpful. Additional specific instructions are given for each section of the questionnaire.

III. RATINGS

Use the 6-point rating scale shown below to rate the individual components of the personnel armor systems for each of the characteristics listed on the questionnaire. Select the term from the scale which best represents your feelings and enter the corresponding scale number (1 through 6) in the appropriate space.

RATING SCALE

Extremely Satisfactory	Very Satisfactory	Fairly Satisfactory	Fairly Unsatisfac-tory	Very Unsatisfac-tory	Extremely Unsatisfac-tory
(6)	(5)	(4)	(3)	(2)	(1)

RATINGS

Characteristics	Vests		Helmets				Comments
	PASGT	STD	P-1	P-2	P-3	STD	
Fit							
Comfort							
Freedom of movement							
Stability							
Putting on							
Taking off							
Ventilation							
Ease of adjustment							
Ease of maintenance							
Security of fasteners							
Weight							
Shape							
Compatibility with: Clothing							
Individual equip.							
Weapons							
Protective masks							
Ease of breathing							
Ease of talking							
Ease of hearing							
Ease of maneuvering							
Ease of marching/moving							
Ease of crawling							
Ease of jumping							

IV. PREFERENCE

Rank the personnel armor systems from 1 (most preferred) to 4 (least preferred) for each of the listed tasks. Place the number, 1, 2, 3, or 4 in the appropriate space to indicate your preferences. If one or more systems are considered equal for a given task, the same rank (number) may be entered. The systems to be ranked are as follows:

Standard Vest w/Standard Helmet = Standard System
PASGT Vest w/P-1 Helmet = PASGT-1 System
PASGT Vest w/P-2 Helmet = PASGT-2 System
PASGT Vest w/P-3 Helmet = PASGT-3 System

A. Preference Rankings

Tasks	STD	PASGT-1	PASGT-2	PASGT-3	Comments
Infantry related task					
Artillery related tasks					
Combat engr related tasks					
Airborne jumps*					

*To be ranked only by personnel who had jump experience with the test items.

B. Overall Preference

If you had to select one of the four personnel armor systems for wear under all combat conditions, which system would you choose as your:

1st Choice (circle one) STD PASGT-1 PASGT-2 PASGT-3

2nd Choice (circle one) STD PASGT-1 PASGT-2 PASGT-3

3rd Choice (circle one) STD PASGT-1 PASGT-2 PASGT-3

4th Choice (circle one) STD PASGT-1 PASGT-2 PASGT-3

Reasons for 1st choice: _____

_____

_____

V. COMMENTS/SUGGESTIONS

Please use this space to provide any additional comments which you may have either favorable or unfavorable, regarding the personnel armor systems tested:

APPENDIX H - MEDICAL PROTOCOLS

The Developmental Test II of a Personnel Armor System for Ground Troops (PASGT) will be conducted at Bolio Lake Test Site, a sub-post of Ft. Greely, Alaska, during the FY77 winter test season (15 Oct 76 - 1 Mar 77).

Bolio Lake Test Site is located approximately eight miles from the main post area of Ft. Greely, Alaska where the U.S. Army Health Clinic Ft. Greely is housed in permanent facilities. U.S. Army Health Clinic is staffed by two doctors, three dentists, one veternarian, one military health nurse, and one registered nurse backed up by a clinical staff.

The U.S. Army Health Clinic, Ft. Greely is supported and backed up by Bassett Army Hospital, Ft. Wainwright, Alaska, 100 miles north of Ft. Greely. Bassett Army Hospital is housed in excellent permanent facilities and has the staff and capabilities of other Army hospitals.

Bolio Lake Test Site has an aid station that is manned by one medical aidmen, MOS 91B20, during winter test season. The aid station is supported and backed up by the U.S. Army Health Clinic, Ft. Greely and a military field ambulance available (at aid station or with test) at all times. One medical aidman will be assigned to the PASGT test team and will be present and colocated with the test team during the conduct of all testing and training.

Allen Army Airfield (AAAF) (Ft. Greely, AK) has a medical evacuation helicopter with flight crew available and on stand-by 24 hours a day for medical evacuation to and from U.S. Army Health Clinic Ft. Greely, and Bassett Army Hospital Ft. Wainwright.

The following table gives approximate medical evacuation times from test sites to medical facilities.

MEDICAL EVACUATION TIMES

		ROAD	AIR
TO:	Bolio Aid Station		
FROM:	Bolio Lake Test Site	NA	NA
	FTX Area	30 Minutes	5 Minutes
	Patrol Area	45 Minutes	15 Minutes
	Equipment Performance Course	10 Minutes	NA
	Ski Trails	5-20 Minutes	NA
	Tennessee Range	NA	NA
TO:	Health Clinic, Ft. Greely		
FROM:	Bolio Lake Test Site	*15-30 Minutes	10 Minutes
	FTX Area	30 Minutes-1 Hour	15 Minutes
	Patrol Area	30 Minutes-1 Hour	15 Minutes
	Equipment Performance Course	*15-30 Minutes	10 Minutes
	Ski Trails	*15-30 Minutes	15 Minutes
	Tennessee Range	15-30 Minutes	10 Minutes
TO:	Bassett Army Hospital Ft. Wainwright		
FROM:	Bolio Lake Test Site	NA	1 Hour
	FTX Area	NA	1 3/4 Hour
	Patrol Area	NA	1 3/4 Hour
	Equipment Performance Course	NA	1 Hour
	Ski Trails	NA	1 3/4 Hour
	Tennessee Range	NA	1 Hour

Time required from Health Clinic Ft. Greely to Bassett Army Hospital Ft. Wainwright is *one to five hours by road and one hour by air.

*Depending on road and weather conditions.

I have read and can comply with or support the medical protocols outlined in this appendix.

David S. Stephens

DAVID S. STEPHENS
CPT, MC
OIC
U.S. Army Health Clinic
Ft. Greely, Alaska

APPENDIX I - REFERENCES

1. Revised Test Design Plan for DT II of Personnel Armor System for Ground Troops (PASGT) 6 Feb 1975.

2. Letter, AMSTE-IN, TECOM, 27 May 1975, subject: DT II of Infantry Fragmentation Subsystem, TECOM Project No. 8-EI-525-000-016, with attached pamphlet.

3. Department of the Army Approved Materiel Need (MN) for a Personnel Armor System for Ground Troops (PASGT), 25 April 1973.

4. Letter, AMSTE-IN, TECOM, 3 February 1975, subject: Coordinated Test Program - Infantry Fragmentation Protective Subsystem.

5. U.S. Army Human Engineering Laboratory, Preliminary results on PASGT with cold weather ensemble(s), April 1975.

6. AR 70-25, Use of Human Volunteers As Subjects of Research, 15 September 1974.

7. TB Med 81.

8. Letter, DRXSY-RW, AMSAA, 27 Feb 76, subject: Revised TDP for PASGT

APPENDIX J - ABBREVIATIONS

PASGT - Personnel Armor System for Ground Troops

MN - Materiel Need

SR - Surface Resistant

FTX - Field Training Exercise

MTTR - Mean Time to Repair

COEA - Cost Operational Evaluation Analysis

CRTC Cold Regions Test Center

APPENDIX K - DISTRIBUTION LIST

Agency	Test Plan	Interim Reports	EPR's	Final Reports
Commander U.S. Army Test and Evaluation Command				
ATTN: DRSTE-IN	7	2	2	10
DRSTE-RM			1	
DRSTE-SG-H				1
DRSTE-PT-MT	1			
Aberdeen Proving Ground, MD 21005				
Commander U.S. Army Logistics Evaluation Agency				
ATTN: DALO-LEI	1	1	1	1
DALO-RI	1	1	1	1
New Cumberland Army Depot New Cumberland, PA 17070				
Commander U.S. Army Materiel Readiness and Development Command				
ATTN: DRCDE-D	3	3		3
DRCRD-R	1	1		1
DRCQA-P	1	1		1
DRCSF	1	1		1
DRCSG	1			1
5001 Eisenhower Avenue Alexandria, VA 22333				
Commander U.S. Army Training and Doctrine Command				
ATTN: TRADOC LO, TECOM	5	5		5
Aberdeen Proving Ground, MD 21005				
Commander U.S. Army Operational Test and Evaluation Agency				
ATTN: DACS-T-EO-N	3	3	1	3
5600 Columbia Pike Falls Church, VA 22041				
Commander Defense Documentation Center for Scientific and Technical Information				
ATTN: Document Service Center				2
Cameron Station, Alexandria, VA 22314				

Agency	Test Plan	Interim Reports	EPR's	Final Reports
U.S. Marine Corps Liaison Officer U.S. Army Test and Evaluation Command Aberdeen Proving Ground, MD 21005	1			1
Commander TRADOC Combined Arms Test Activity ATTN: ATCAP-OP Fort Hood, TX 76544	1			1
Director DARCOM Field Safety Activity ATTN: DRXOS-ES Charlestown, IN 47111				1
Headquarters Department of the Army ATTN: DAMA-CSS	1			1
DAMA-PPM-T	2			2
DAMA-WS	1			1
DALO-SMM-E	1			1
DALO	1			1
DAMO-FD Washington, DC 20310	1			1
Headquarters Department of the Army ATTN: DAPC-PMO Alexandria, VA 22331	2			2
Headquarters Department of the Army ATTN: SGRD-RDZ-HA Washington, DC 20314	1			1
Commandant of the Marine Corps Code RD Headquarters Marine Corps Washington, DC 20380	1			1
Director Development Center Marine Corps Development and Education Command Quantico, VA 22134	1			1

Agency	Test Plan	Interim Reports	EPR's	Final Reports
Commander U.S. Army Logistics Center ATTN: ATCL-M Fort Lee, VA 23801	2		1	2
Commander U.S. Army Environmental Health Agency ATTN: HSE-OB Aberdeen Proving Ground, MD 21010				1
Commander U.S. Army Training and Doctrine Command ATTN: ATCD-CS ATCD-PM ATCD-TM Fort Monroe, VA 23651	 1 1		1	 1 1
Commander U.S. Army Combined Arms Combat Developments Activity ATTN: ATCA-MI ATCA-CS-P ATCA-CCM Fort Leavenworth, KS 66027	 1		1 1	 1
Commander U.S. Army Maintenance Management Center ATTN: DRXMD-E DRXMD DRXMD-T Lexington, KY 40507	2 2 1		1 1	2 2 1
Director U.S. Army Materiel Systems Analysis Activity ATTN: DRXSY-RW DRXSY-RE DRXSY-M Aberdeen Proving Ground, MD 21005	1 1 1		1 1 1	1 1 1
Commander Engineer Topographic Laboratories ATTN: ETL-GS-AC Fort Belvoir, VA 22060				1

Agency	Test Plan	Interim Reports	EPR's	Final Reports
Commander U.S. Army Armament Command ATTN: DRSAR-RD Rock Island, IL 61201	3			3
Commandant U.S. Army Infantry Center and Fort Benning ATTN: ATZB-GD-MS-C Fort Benning, GA 31905	1	1	1	1
Commander Northern Warfare Training Center APO Seattle 98733	1			1
Commander U.S. Army Combat Developments Activity (Alaska) ATTN: ATCA-AL APO Seattle 98749				1
Commander U.S. Army Natick Research and Development Command ATTN: DRXNM-EPT Natick, MA 01760	3	2	1	20
Commander U.S. Army Tropic Test Center APO New York 09827	1	1	1	1
Commander U. S. Army Aberdeen Proving Ground ATTN: STEAP-MT-I Aberdeen Proving Ground, MD 21005				
Commander U.S. Army Research Institute of Environmental Medicine ATTN: SGRD-VE-ME Natick, MA 01760	1			1
Commander U.S. Army Aeromedical Research Laboratory ATTN: SGRD-UAE Fort Rucker, AL 36362	1			1