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TECHNICAL REPORT  
NATICK/TR-80/012

**US ARMY SURVEY OF AIRCREW  
SURVIVAL KITS/VESTS**

by

Thomas H. Judge

JANUARY 1980

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER <b>18</b> NATICK/TR-88/912	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) <b>SURVEY OF SURVIVAL KITS/VESTS</b> <b>US Army</b>		5. TYPE OF REPORT & PERIOD COVERED Final January 1980
7. AUTHOR(s) Thomas H./Judge		6. PERFORMING ORG. REPORT NUMBER CEMEL-210
9. PERFORMING ORGANIZATION NAME AND ADDRESS US Army Natick Research and Development Command ATTN: DRDNA-VCA Natick, Massachusetts 01760		8. CONTRACT OR GRANT NUMBER(s) <b>Final reptis</b>
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Natick Research and Development Command ATTN: DRDNA-VCA Natick, Massachusetts 01760		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 93042580 243 <b>12</b> 1001
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) N/A <b>14</b> CEMEL-210		12. REPORT DATE Jan 89
		13. NUMBER OF PAGES 100
		15. SECURITY CLASS. (of this report) UNCLASSIFIED
		15a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report) Approved for public release, distribution unlimited		
17. DISTRIBUTION STATEMENT (of the abstract entered in block 20, if different from Report) N/A		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) SURVIVAL KITS                      RADIO EQUIPMENT                      CONFERENCES SURVIVAL EQUIPMENT              SURVIVAL RATIONS                      SURVEYS SURVIVAL VESTS                      LIFE RAFTS CLOTHING                              CRASHES SURVIVAL (PERSONNEL)              SURVIVAL (GENERAL)		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number) For a number of years aircrewmembers have complained of problems with survival kits, vests, and components. These complaints have been debated time and again with no resolution forthcoming to meet the comprehensive crash survival needs of the aircrewmember. In an effort to resolve these complaints, a survey was initiated throughout the U.S. Army Aviation Community to identify the problem areas and develop rationale for corrective action. → next page		

This report discusses results of the survey and conferences held following completion of the survey. Medical, Crash, Search and Rescue and Aviation Community Data provided rationale for new approaches to survival kits and vests. These approaches to reduce the amount of present day survival components were modified by each conference and upgraded to improve the aircraft crash survival environment. The reductions in helicopter crash fires and the ability of rescue teams to recover crash survivors in six hours or less has contributed to the need to replace present day non-essential items with only essential, absolute need, survival components.



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## SUMMARY

This survey was initiated to identify problem areas concerning survival kits and vests. This was accomplished with the outstanding support of the US Army Aviation Community. The documented input identified problems in design of the survival vest, the overburdening of the survivor with non-essential survival vest items, and component designs that interfere with aircraft exit and operation of flight controls. The survival kits were cited for outdated items, food contamination, damaged components and design concepts that no longer meet today's survival needs. Recommendations are being proposed to develop a new vest to contain only essential need items reducing bulk and interference of flight controls, a survival environmental packet to provide individual essential need for specified environment use, and an aircraft carry-on modular kit system is being proposed for use by crewmembers and passengers, in general, and on specified environmental flight missions.

This information can now be used to justify the assignment of US Army Development Joint Working Groups for initiation of Letter Requirements (LR) to develop and design new kits, vests, and components.

An Army Survival Kit and Vest Conference was held in St. Louis, MO on 15-16 Nov 78 to review the Survey Data and recommend corrective actions or development programs. The survey recommendations were reviewed and modified for presentation to Joint Working Groups for the initiation of Letter Requirements (LR's). This conference also recommended that the survival kits and vests of the other services, Air Force and Navy, be reviewed with the possibility the Army could use survival vests, kits, and components they had under development.

A TRI-Service Conference on Survival Kits and Vests was held at the US Army Natick Research and Development Command, Natick, MA on 20-21 March 1979. The objective of this conference was to review with the other services and Canadian Armed Forces, any needs and requirements for Survival Kits, Vests and Components. Search and Rescue personnel of the US Coast Guard, the US Air Force Search and Rescue Command at Scott AFB, IL and the Army Research Institute of Environmental Medicine, Evacuation Study Groups, were asked to present their views as rescuers on the present survival equipment and what changes they would like to see.

This conference provided a different viewpoint on what's needed and most useful during a rescue operation. The results have led to a new design approach for the development of a survival vest that would provide only essential day and night signal and communication equipment with options for essential environmental needs. The Survival Kit would complement the vest and provide optional essential survival equipment not carried in the vest.

The survey and conference recommendations have been drafted into requirement documents for future US Army development programs for survival vests and kits.

These requirement documents will propose three programs be undertaken to develop the following items:

1. An Aircrew Survival/Armor/Recovery vest to provide the aircrew-member with a survival vest that will have the capacity for retaining essential survival signal and communication components, provisions for attachment of an underarm life preserver, a fragmentation protective carrier containing an armor insert, storage pockets for essential environmental survival components required in the environmental area where the vest is to be used and provide for a hoist pick-up ring and strap that will attach to a rescue helicopter hoist cable.

2. A Survival Environmental Packet to provide the aircrewmember with essential environmental survival components for the Survival/Armor/Recovery Vest. This will provide a means of immediate essential self-aid following an aircraft accident in a specified environmental area such as; Hot Weather, Cold Weather, Arctic, and Over-Water Flights.

3. An Aircraft Modular Survival System that provides the aircrews and passengers operating in all climatic regions a system for emergency survival situations. This system will complement the survival vest which will carry critical survival items on the body of each individual. The modular container system stowed on board the aircraft shall contain the remaining heavier, bulkier items for crew and passenger use. The system will consist of a general container supplemented by environmental containers designed for specified environments where the aircraft and its crew or passengers are to be flying at the time of survival need.

A TRADOC/NARADCOM Joint Working Group met at NARADCOM 11-12 September 1979. The attendees to this meeting accepted the basic recommendations for the proposed draft Letter Requirements (LR's). The working group then defined the survival and environmental components to be used in the Survival Armor Recovery Vest, the Environmental Packet and the Aircraft Modular Survival System.

These documents have been redrafted and are in the process of coordination among US Army Aviation Agencies, USAF, US Navy, US Marine Corps, and the US Coast Guard.

## FOREWORD

This report represents the efforts and conclusions of US Army Aircrewmembers scattered throughout the US Army and National Guard Aviation Community Stateside, Alaska, and Hawaii. The recommendations and conclusions are the results of conferences held 24 Jan 78 at Ft. Rucker, AL; ALSE Management Steering Council Meeting held 7 Jun 78 in Atlanta, GA; 16 Nov 78 in St. Louis, MO; the Survival Kit/Vest Conference held 14-15 Nov 78 in St. Louis, MO; and the TRI-Service Conference on Survival Kits and Vests held at USA Natick Research and Development Command, (NARADCOM), Natick, MA, 20-21 Mar 79. The report's contents, conclusions, and recommendations reflect the need to revise survival kits and vests - to provide only the actually needed equipment for aircrewmembers to survive an aircraft accident and reduce their handicaps resulting from bulky and overweight survival kits and vests.

The Survival Kit/Vest Working Group Chairman, Mr. Thomas H. Judge, NARADCOM, was assisted in collecting and consolidating data for this survey by: Mr. Raymond Birringer, USAAVNC, Ft. Rucker, AL; Mr. William Jones, HQ FORSCOM, Ft. McPherson, GA; CW4 Jerry E. Nowicki, National Guard Bureau, Edgewood Arsenal, MD; LTC Bruce Chase, TOSG, Washington, DC; Mr. James Bailey, US Army Safety Center, Ft. Rucker, AL; Mrs. Linda Apponyi, DRCPO-ALSE, TSARCOM, St. Louis, MO; and Ms. Roberta Carnaroli, NARADCOM. Their outstanding efforts contributed greatly to the success of this survey and its total impact on the improvement of aircraft crash survival.

The success of the 20 Mar 79, TRI-Service Conference on Survival Kits and Vests is attributed to the following people and their presentations:

LTC Donald J. Marmon, USANARADCOM  
LTC Franklin J. McShane, USARIEM  
Dr. Ralph Goldman, USARIEM  
Dr. Murray P. Hamlet, USARIEM  
Major Steven Howell, USAF, AARS, Scott AFB, IL  
CW4 John Vasko, 25th Infantry, Hawaii  
CPT Phillip Webb, TRADOC, CDC, Alaska  
CPT Donald Gibson, 172 Infantry Bdg, Alaska  
LTC J. Wallington, Canadian Armed Forces  
Major D. Corkburn, Canadian Armed Forces  
CPT D. Martella, Canadian Armed Forces  
W.O. P. J. Vandenburg, Canadian Armed Forces  
Mr. J. Firth, National Defense HQ, Ottawa, Ontario, Canada  
MPCO D. J. Dugan, US Coast Guard, Mobile, AL  
ASMC D. Gelokoska, US Coast Guard, Cape Cod Station  
Mr. D. DeSimone, NADC, Warminster, PA  
Mr. K. Troup, USAF ASD Wright Patterson AFB, OH  
Ms. Alice Meyer, NARADCOM  
Dr. Donald E. Westcott, NARADCOM  
Mr. William Jones, HQ FORSCOM, Ft. McPherson, GA  
Mr. J. Nowicki, National Guard Bureau, Edgewood, MD

Appreciation is also expressed for the outstanding administrative assistance of Ms. Joanne Witt in the assembling of this report for publication.

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## US ARMY SURVEY OF SURVIVAL KITS/VESTS

### INTRODUCTION

A survey of Survival Kits/Vests was initiated following a Training and Doctrine Command (TRADOC) Aviation Life Support Equipment (ALSE) Conference convened at Ft. Rucker, AL during January 1978 to review a number of problem areas involving Aviation Life Support Equipment. As an informal part of this conference a number of members reviewed the needs and requirements for survival kits and vests.

With the assistance of representatives of US Army Training and Doctrine Command, Forces Command, Office of The Surgeon General, The National Guard Bureau, the US Army Safety Center, and Dept of Army Development and Readiness Command, the "Survey on Survival Kits/Vests" was initiated in July 1978.

The survey was addressed to the US Army Aviation Community in general and they were requested to identify problem areas involving Aircrew Survival Kits/Vests. The US Army Safety Center, Ft. Rucker, AL was requested to review its data bank for accident data that would identify aircraft crash and survival experiences. Office of The Surgeon General was asked to review statements identifying survival food packet and drug contamination.

The survey was divided into four parts:

- Part 1 - Aircraft Crash-Survival Experiences
- Part 2 - Problem Area Designation
- Part 3 - Medical Review of Drugs and Food Contamination
- Part 4 - Stock Review of Defense Logistic Agency and Pre-positioned War Reserve Inventories.

## PART 1 - AIRCRAFT CRASH-SURVIVAL EXPERIENCES

The first indication an aircraft accident has occurred is the notification of the Airfield Control Tower or Flight Operations that an aircraft is down. This survey asks the question; "How was the tower and operations notified?" This is important information in order that the process can be reviewed and improved for the future success of rescue and survival recovery operations.

"How was the rescue team directed to the downed aircrewmember?" and "What equipment was used to recover the survivor?" - all important questions in need of answers for future survival radio or beacon designs.

The knowledge of the physical condition of the survival and his assistance in a rescue recovery operation will aid in the development of mini-medical kits to assist the injured in providing immediate self-aid while waiting rescue.

The problem of identifying and locating the survivor should be of prime importance for speedy rescue recovery for those that may be injured and those down in enemy territory. This can only be done by identifying those terrains and physical locations most used and developing new equipment to meet the needs.

The accident data is collected at the time of accident de-briefing and during the follow-on accident investigation. Part of the data collected is that reported on USAAVS Form 87-70, Survival and Rescue Work Sheet. These work sheets contain 24 blocks of information, however, we will use only 9 blocks. These are considered to have revealed sufficient information for this survey and separates private information regarding the survivor. All action items on the form were numerically identified for conversion to computer language for retrieval and application to programs such as this survey's requirement. This data will assist in identifying:

- Rescue Alerting Means
- Means Used to Locate Individuals
- Problems in Locating Individuals
- Rescue Equipment Used
- Problems that Complicated Rescue
- Survival Problems Encountered
- The Individual's Physical Condition
- Survival Equipment Used during Crash and Survival Recovery.

The operation of a rescue team is the most important function during rescue recovery, thru these accident reports we can follow both the team and the survivor in the recovery attempt to determine their success during the rescue and what equipment provided them the greatest support for success in the recovery of the downed aircrewmember.

### A. Rescue Alerting Means

Signal devices and survival radios were available, but being observed by others was the prime means used to alert airfield control towers and flight operations of a downed aircraft.

Other radio reports and May Day messages ranked high as alternate means of alerting rescue activities.

The number of cases reviewed was 1,310. (Table I) Survival radios can only be assumed as being part of the "Other Radio Report" category. Table I outlines the top five methods used in alerting rescue teams.

TABLE 1  
RESCUE ALERTING MEANS

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
OBSERVED	306	321	210	22	185	14	39	0
OTHER RADIOS	123	96	74	14	55	8	6	7
RADIO MAYDAY	143	107	31	8	42	2	32	0
OTHER TELEPHONE	72	79	54	4	17	18	7	7
LOSS OF RADIO CONTACT	39	79	62	5	8	2	11	0

### B. Means Used To Locate Individuals

People observing the accident were the basic means of directing rescue teams to crash sites in most of the cases recorded during this data period, 1969 - June 1978, without the aid of a signal.

The data has identified beacons, walki-talkie, fire, telephone, reflective tapes, mirror, clothing, flares, strobe light, and dye marker as all being used at some time to direct rescue units to the accident scene and the survivors. The ranking of these items can be found in Table 2.

TABLE 2  
MEANS USED TO LOCATE INDIVIDUAL

<u>RANK</u>	<u>MEANS</u>	<u>COUNT</u>
1	Accident observed	88
2	Accident site located w/o aid of signals or equipment	45
3	Individual located w/o aid of signals or equipment	41
4	Other aircraft orbiting scene to direct rescue personnel	40
5	Aircraft radio prior to accident	28
6	Telephone	27
7	Aircraft radio after accident	25
8	Survival radio	23
9	Survivor located rescuers	15
10	Radio/radar vector or DF steer	15
11	Fire	12
12	Voice	12
13	Pen gun flare	12
14	Smoke	8
15	Reflective surface	5
16	Mirror	4
17	Strobe light	4
18	Flight clothing	4
19	Smoke flare	3
20	Walkie talkie	3
21	Aircraft lights	3
22	Signal flare	2
23	Raft	2
24	Parachute	2
25	Reflective tape	1
26	Dye marker	1
27	Signals on surface	1
28	Other	26

Prepared by US Army Safety Center

C. Problems in Locating Individuals

After reviewing 1288 cases, most of the survivors had no problems in being located and identified after their accident. (Table 3) However, trees and darkness created problems for rescuers attempting to reach some survivors of a crash in a number of the cases reviewed.

TABLE 3  
PROBLEMS IN LOCATING INDIVIDUAL

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
NO PROBLEMS	395	339	230	19	149	16	37	7
DARKNESS	26	91	57	5	34	15	18	0
TREES	6	153	80	0	0	2	7	0
REDUCED VISIBILITY	13	72	71	4	5	8	2	0
LACK OF CORRECT INFO.	28	50	31	5	17	0	9	0

D. Rescue Equipment Used

The rescue teams when arriving on the accident site, in most cases, used the stretcher and first aid equipment. The Forest Penetrator was used in the trees and the Helicopter Platform was used in open ground (Table 4).

TABLE 4  
RESCUE EQUIPMENT USED

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
STRETCHER	138	129	64	12	18	3	24	0
FIRST AID EQUIP.	85	97	46	10	7	5	28	0
FOREST PENETRATOR	0	49	39	0	11	0	1	0
HELICOPTER PLATFORM	25	16	19	4	15	0	14	7
KNIFE	17	12	8	2	8	2	1	0

E. Problems That Complicated Rescue

Darkness, fire, topography, and weather complicated rescue attempts prolonging the arrival of aid to injured personnel. Entrapment of survivors in aircraft and in trees further delayed rescue efforts. (Table 5)

TABLE 5  
PROBLEMS THAT COMPLICATED RESCUE

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
DARKNESS	35	130	79	9	48	14	19	0
FIRE	36	140	128	0	6	0	1	0
TOPOGRAPHY	12	113	110	3	20	10	12	7
WEATHER	26	88	72	4	34	17	11	0
OTHER	35	71	22	3	53	0	17	0

F. Survival Problems Encountered

The major problem that must be dealt with during the rescue recovery is the survivor that is incapacitated by injury. Trees further complicated the situation by hampering the actions of rescue personnel in their attempts to reach the injured survivor. (Table 6)

TABLE 6  
SURVIVAL PROBLEMS ENCOUNTERED

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
INCAPACITATED BY INJURY	119	146	97	4	51	8	10	0
DAZED	63	49	30	1	7	3	7	0
OTHER	37	58	29	1	29	0	16	0
DARKNESS	18	62	39	0	29	14	13	0
CONFUSED	29	63	48	0	13	0	5	0

### G. Individual Physical Condition

The physical condition of the survivor is an important factor during the time of rescue. If he is physically fit then he can go a long way in providing rescue assistance. However, when a survivor is injured, the rescue outcome can become questionable based on the extent and the seriousness of the injury. The data bank revealed a large number were able to assist rescue personnel in their recovery. However, there were a number of survivors reported fatal on recovery due to injuries sustained during the accident in predominantly tree areas.

An equal percentage of survivors were able to partially assist rescue teams because of their injuries and less than a half of a percent were lost during a rescue over water. (Table 7)

TABLE 7  
INDIVIDUAL PHYSICAL CONDITION

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
FULLY ABLE TO ASSIST	228	191	5	22	155	20	32	7
FATAL ON RECOVERY	62	181	134	4	29	2	14	0
PARTIALLY ABLE TO ASSIST	97	132	72	5	29	6	10	0
IMMOBILE OR UNCONSCIOUS	66	42	27	3	6	5	9	0
FATAL ON RECOV. DROWNED	2	4	3	0	32	0	0	0

### H. Factors that Helped Rescue

The training of rescue personnel is vital to the successful recovery of an aircraft accident survivor.

The coordination of all rescue equipment and personnel as a working unit and the availability of this equipment to assist in the recovery operations at accident sites has been identified by the data as a leading contribution to the success of the recovery of aircraft accident victims. (Table 8)

TABLE 8  
FACTORS THAT HELPED RESCUE

	OPEN GROUND	TREES	MOUNTAIN	DESERT	WATER	SNOW	BOGGY	ICE
TRAINING OF RESCUE PERS.	134	236	151	19	79	7	22	7
COORDINATION OF RESCUE	140	177	94	10	65	17	37	5
AVAILABILITY OF RESCUE EQUIP.	112	108	54	10	72	10	13	2
SUITABILITY OF RESCUE	53	85	38	7	12	11	9	0
PRE-ACCIDENT PLANNING	76	57	20	9	17	5	13	2

I. Signal Devices

The availability rate for the signal device, although not specifically identified, was high, and the need for signal devices was indicated in the cases reported. The greatest need was during rescue when a number failed. Trees and mountains are areas where they were utilized the most (Table 9).

TABLE 9  
SIGNAL DEVICES

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER
REQUIRED	94	192	156		
AVAILABLE	123	194	154		
USED DURING ACCIDENT		22	18		14
USED DURING SURVIVAL	3	2			2
USED DURING RESCUE	36	46			30
NEEDED DURING ACCIDENT		18	18		4
NEEDED DURING SURVIVAL	3	4			3
NEEDED DURING RESCUE	36	60	36		
DISCARDED		3			3
LOST	4			4	4
FAILED RESCUE	6	6			12

J. Survival Radio

The Survival Radio is a must with everyone that flies military aircraft. It is known that on many occasions aircrewmembers have been carrying two radios in the event one doesn't work. These radios were available when needed; however, they also had a substantial failure rate.

This failure rate is substantiated by the amount of correspondence received during this survey from field activities where some have reported a failure ratio as high as twenty-five percent.

The radio plays an active part in rescues, and it was during water rescue operations that a number of those used failed during recovery of the survivor (Table 10).

TABLE 10  
SURVIVAL RADIO

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER
REQUIRED	102	127	91		
AVAILAEBLE	113	114	73		
USED DURING ACCIDENT	4				4
USED DURING SURVIVAL	6	11	12		
USED DURING RESCUE	38	55			24
NEEDED DURING ACCIDENT	4				4
NEEDED DURING SURVIVAL	8	15	12		
NEEDED DURING RESCUE	50	70			27
DISCARDED					3
LOST	7	2			4
FAILED ACCIDENT		1	1		11
FAILED RESCUE	19	22			11

K. Knife

The type of knife used during these accidents was not identified for the data collected. It was available most of the time, when required. (Table 11)

L. Survival Kit

The identity of the survival kit and its type are not detailed in the data. They were available when required and had a small failure rate most of the time. (Table 12)

TABLE 11  
KNIFE

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER	SNOW	BOGGY	ICE
REQUIRED	53	70	52					
AVAILAHE	81	69	52					
USED DURING ESCAPE		3	3					2
USED DURING SURVIVAL	2					5	2	
USED DURING RESCUE		13	10		9			
NEEDED DURING ESCAPE		3	1		1			
NEEDED DURING SURVIVAL	2	2			6		2	
NEEDED DURING RESCUE	5	30	23					
LOST		1	1		2			
FAILED ESCAPE					1			
FAILED RESCUE					4			

TABLE 12  
SURVIVAL KIT

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER	SNOW	BOGGY
REQUIRED	90	92	81				
AVAILABLE	113	83	77				
USED DURING ACCIDENT					1		
USED DURING SURVIVAL	5	11	11			5	
USED DURING RESCUE	11	11	7				
NEEDED DURING ACCIDENT							
NEEDED DURING SURVIVAL	9	15	10				
NEEDED DURING RESCUE	15	31	20				
DISCARDED		1	1		1		
LOST			9		6	7	
FAILED SURVIVAL	2						2
FAILED RESCUE					4		

M. Use of Life Vests

The need for a life vest is dependent on the flight over water areas large enough to prevent the planes from entering a return glide path to land. Exception to this can be noted in the data which reveals that life vests were available when needed even in the open ground and in trees. This can only lead to the conclusion that they were used during emergency flood conditions, recovering flood victims when the accident took place. The failure ratio is "0", which is the way all survival equipment should be. (Table 13)

TABLE 13  
USE OF LIFE VESTS

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER	SNOW	BOGGY
REQUIRED	13	5			14		
AVAILABLE	17	6	6		12		
USED DURING SURVIVAL					7		
USED DURING RESCUE	3	2					
NEEDED DURING SURVIVAL					18		
NEEDED DURING RESCUE	1						1
LOST		1			2		1

N. Use of Life Rafts

The type and identification of the raft recorded in this data is not known, for there are several size rafts available for use. The availability rate met the need very well; however, out of the 56 cases reported, six rafts were lost, and the failure rate was low. (Table 14)

TABLE 14  
USE OF LIFE RAFTS

	OPEN GROUND	TREES	MOUNTAINS	DESERT	WATER	SNOW	BOGGY
REQUIRED	10				23		5
AVAILABLE	18				12		6
USED DURING SURVIVAL					13		
NEEDED DURING SURVIVAL					22		
DISCARDED					1		
LOST	4	1					1
FAILED RESCUE					2		

## PART 2 - PROBLEM AREA DESIGNATION

All major aviation commands were tasked to survey their supporting elements in regards to complaints and recommendations identified on the presently issued items of Survival Kits and Vests, and the survival components installed in each kit and vest. All units were asked to examine their problem areas with attention to:

- Requisitioning and Supply Support.
- Quality of items received.
- Fitness of Kit/Vest and components to meet survival needs.
- Design of Kit/Vest to meet requirements.
- Maintenance Support.
- Actual Aircraft Crash Survival Experiences.
- Food and Drug spoilage or contamination.

The above action was expected to open Pandora's box, however, over ninety percent of the results received have been constructive with only a very small amount of unrealistic proposals.

The results were sent by aviation units to their Command Headquarters where they were consolidated and forwarded to Natick Research and Development Command for review and inclusion in the overall survey. This effort did achieve what it set out to do: to get the entire aviation community involved in this survey, for only with their input can new requirements be initiated.

The problems, recommendations, and rationale are those of the individual submitter. They have been consolidated under individual survival Kits/Vests in order to present a total view of the problem area.

### A. SRU-21P Survival Vest (Figure 1)

This vest is the most used and attacked survival item in the survival inventory. It draws more attention due to everyday visibility and represents to the wearer a small means of immediate self-survival following an aircraft accident.

Comfort, poor fit, bulky design, and nylon materials are of great concern in view of possible secondary injuries that may be caused by failure to exit the aircraft and burns that may result from the crash. Pocket design impacts on the operational performance of the wearer and can interfere with the motion of the aircraft controls during flight operations.

There are too many survival components installed in the survival vest that have no immediate actual need for being there such as: .38-cal holster, tourniquet, fishing net, and .38-cal arms. These items have no application to immediate self aid or recovery following an aircraft crash.



Figure 1. SRU-21/P Survival Vest

B. OV-1 Survival Vest for Mohawk Aircraft (Figure 2)

This vest has met the needs of a small group of aviators, flying the OV-1 Mohawk Aircraft, very successfully. The vest contains the same number of type of survival components presently in the SRU-21/P Survival Vest. Only a few supply problems exist at this time, and recommendations for improvement were minor.



Figure 2. OV-1 Survival Vest

### C. Survey Vest Recommendations

Data Reviews should be conducted in the following areas:

1. To define actual survival needs of the vest in terms of survival application such as: Immediate self-survival and recovery 12 hours and less.
2. To define the actual needs for various survival components to meet this requirement, and elimination of all other components from the vest.
3. To establish absolute priorities for components used in the vest and placing restrictions on others such as: Priority One, Signal Devices; Priority Two, Mini-Self-Administered First Aid; Priority Three, Self-Identification and Compass.

A human factors study should be conducted of component pocket location vs. safe operational envelopes of all aircraft/helicopters and emergency escape procedures during and following aircraft accidents.

A new survival vest should be developed to include the above study results and the following design changes:

1. Material should be one of fire retardant and/or resistant to prevent injuries from burns.
2. Side adjustment should be used to provide more flexibility in size adjustment when worn with heavy clothing.
3. Sizes should include Small, Medium, Large, and Extra Large.
4. Restriction should be placed on the thickness of all components and pockets.

#### D. General Survival Vest and Component Recommendations

Survival vest and survival components should be restricted to absolute, immediate need items to advance the survivor's ability to provide self administered aid, and to assist in recovery and survival following an aircraft accident. All other absolute need items for extended survivor use should be allocated to the various type individual kits. All characteristics of survival vest components should be carefully examined for negative factors which might outweigh their usefulness. Unless a component is light in weight, flat in shape, easy to operate, durable, reliable, and essential to short-term survival, it should be seriously considered for rejection. Another criteria which should be applied to each component is what difficulties a partially disabled crewmember might have in attempting to use or operate it.

#### E. Overwater Survival Kit Individual (Figure 3)

This kit is supposed to provide survival in water to the aircrewmember. However, it is reported to be a hazard in some aircraft and not properly maintained. There is no method of controlling the kit once the aircraft has ditched in water. Some of the components were found by some to be unfit for use.



Figure 3. Overwater Survival Kit Individual

F. OV-1 Rigid Seat Survival Kit (Figure 4)

This kit seems to meet the need of the OV-1 type aircraft pilot and observer successfully. However, it has been reported that heat build-up within the cockpit can cause possible deterioration of the Survival Kit contents.



Figure 4. OV-1 Rigid Seat Survival Kit

G. Survival Kit Hot Climate (Figure 5)

The size and shape of this kit creates problems in AH-1 and OH-58 type helicopters. The contents of the kit have a history of being damaged on crash impact.

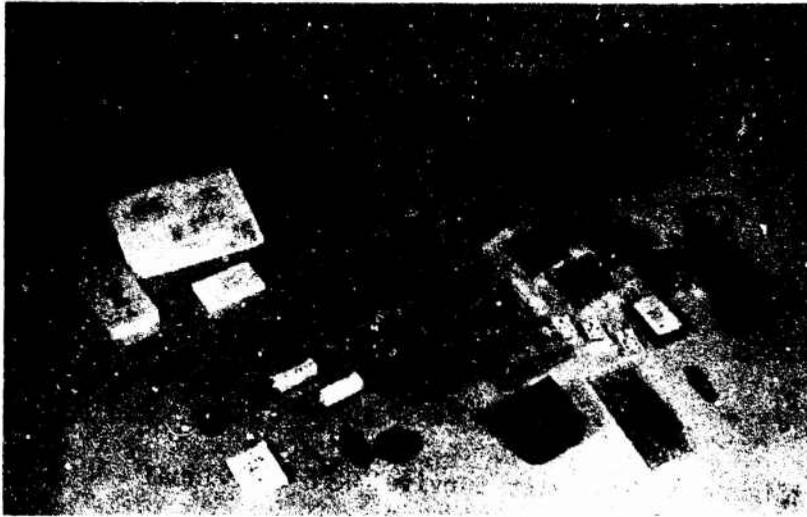


Figure 5. Hot Climate Survival Kit

H. Survival Kit Cold Climate (Figure 6)

From the large quantity of complaints received on this kit, it is evident it is not adequately designed for use of US Army Aircrewmembers in cold regions and in UH-1, AH-1, and OH-58 helicopters. A new cold weather kit concept will be needed.

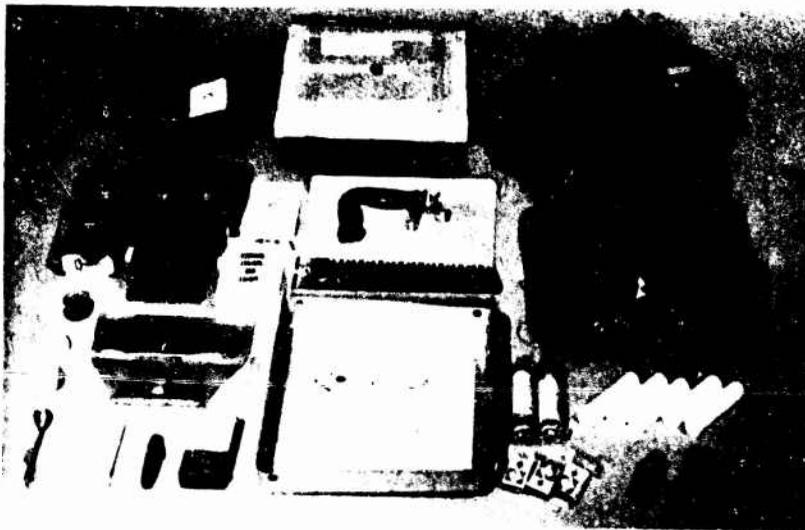


Figure 6. Cold Climate Survival Kit

## I. Survival Kit Recommendations

1) A study be initiated to completely review the water survival problems and procedures related to the Attack, Observation, and Utility type helicopters.

2) The results of this survey and the above study be applied to a requirement document for a new overwater kit for attachment to the wearer.

3) A packaging study is recommended to develop new, more durable, packaging methods to secure these components from damage on crash impact.

4) A requirement document should be initiated to develop smaller survival kits that can be used in both AH-1 and OH-58 helicopters and be more responsive to the needs of the downed aircrewmember.

5) A study is recommended to provide an up-to-date review of environmental region requirements for aircrews' survival needs and the results of this study be used as a justification for initiation of a requirements document to develop a suitable survival kit for each climate.

## PART 3 - MEDICAL REVIEW

The objective of the medical review was to review the problems cited in regards to food and drug contamination found in Survival Kits and Vests components.

The Survival Kit, Individual Tropical, which in effect is a first aid kit, also required the attention of Medical Personnel.

The Surgeon General's Office recommended the upgrading of the food processing with the intent of establishing a longer shelf life. In response to this, the Food Engineering Laboratory of NARADCOM furnished input to identify the problems of upgrading a manufacturing process that in most cases the manufacturer is unwilling to update because of such a small demand for his product. Of course, the lack of inspection in the field has also contributed to the failure to remove food packets from survival kits after their time has expired. This problem points out the need for inspection procedures in the supply system prior to the issue of the equipment for active use.

The US Army Troop Support and Aviation Materiel Readiness Command recommends; "Life limitation items should be requisitioned by the user directly from the managing agency." This procedure would insure that the user would receive serviceable components and eliminate the need to maintain Army depot stocks for these life limitation items.

The Survival Kit, Tropical is not satisfactory because of its design, as it interferes with aircraft controls which can cause blunt trauma to the chest and liver during crash. It also contains many nonmedical items which should be removed or relocated to other parts of the vest. Problems have been reported with several components of the kit, such as the eye ointment. These will require evaluation, and substitutes will be considered. One of the drug problems is with the anti-diahrrea drug. There are problems with procurement and security because it is a controlled drug. However, there are no satisfactory substitutes, and it needs to be retained to protect against dehydration in hot, dry climates and against incapacitation during escape and evasion.

The tourniquet most likely should be removed from the vest. Limbs are often lost by misuse of tourniquets. When one is required, it can be made from other materials. Most cases of serious bleeding are better treated by direct pressure, and tourniquets are rarely indicated.

The need for Nomex material in the Survival Vest is questionable based on our thermal injury history. We have had essentially no thermal injuries in survivable accidents in aircraft equipped with the crashworthy fuel systems, and it is recommended that USAARL review the records to determine the need for a Nomex Vest material. Since Nomex knits have not proven practical for load retention, the additional thermal stress which would be imposed by the standard Nomex cloth must be considered versus the risk of thermal injury.

The US Army Aeromedical Research Laboratory has been tasked to investigate problem areas and recommend improvements that can be applied to medical components of the survival kit and vest. One action required is to review accident data on personnel recovery times to establish the length of time - e.g., 12 or 24 hours - for which medical supplies should be planned.

Since the medical components are small and lightweight, another question comes to mind; do we really need a long supply of food to sustain an individual if he can be picked up in 12 hours instead of five days. This would lighten the weight and size of the survival kits. Space food technology should be used to deveiop better, lighter weight, survival rations. The US Army Safety Center furnished elapsed-time figures (Tables 15 and 16) that illustrate six hours could be used for planning purposes; however, USAARL recommends the use of 12 hours as an added safety factor.

TABLE 15  
ELAPSED TIME FOR SURVIVING AVIATORS (HRS)

<u>TIME(HRS)</u>	<u>UNTIL REACHED</u>	<u>RESCUE COMPLETED</u>
0:00-0:29	156 67%	91 40%
0:30-0:59	25 11%	52 22%
01:00-01:29	24 10%	33 14%
01:30-01:59	10 4%	16 7%
02:00-02:29	6 2%	10 4%
02:30-02:59	7 3%	9 4%
03:00-04:59	2 1%	16 7%
05:00-06:59	2 1%	3 1%
07:00-09:59	0	2
10:00-14:59	0	0
15:00-19:59	0	0
20:00-24:59	0	0
25:00-29:59	0	0
30:00-39:59	2 1%	2 1%
	<u>234 (100%)</u>	<u>234 (100%)</u>

1 Jan 72 - 7 Mar 79  
Prepared by U.S. Army  
Safety Center

TABLE 16  
ELAPSED TIME FOR FATALY INJURED AVIATORS (HRS)

<u>TIME(HRS)</u>	<u>UNTIL REACHED</u>	<u>RESCUE COMPLETED</u>
0:01-0:29	10	1
0:30-01:00	4	4
01:01-01:30	1	1
01:31-02:00	0	
02:01-04:00	1	5
04:01-10:00	1	4
10:01-20:00	2	2
20:01-30:00	2	1
30:01-40:00	0	1
	<u>21</u>	<u>19</u>

(2 not reported)

PART IV - STOCK REVIEW OF DEFENSE LOGISTIC AGENCY AND PREPOSITIONED  
WAR RESERVE STOCKS

The reports received from these areas revealed Survival Vests are controlled by DSA Philadelphia and the kits were controlled by the Army Troop Support and Aviation Materials Readiness Command in St. Louis, MO.

The Survival Vest SRU-21/P stock was sufficient to meet the aircrew-member needs.

The Survival Kits are not assembled and held in stock. These kits will be assembled upon need or request. This is the result of having shelf life items installed in these kits.

The stock control office at TSARCOM recommends life limitation items should be requisitioned by the user directly from the managing agency. This procedure would insure that the user would receive serviceable components and eliminate the need to maintain Army depot stocks for these items.

ACTIONS TAKEN AS A RESULT OF THE SURVEY

A. US Army Survival Kit and Vests Conference (Appendix A)

This conference was convened on 14-15 November 1978 in the Federal Mart Building, St. Louis, MO for the purpose of reviewing the survey results and proposing appropriate corrective measures.

Presentations were delivered by participants on the survey results, with Medical data update and background on previous development actions, EIR's, suggestions, and a review of FORSCOM inspection tours of Hawaii, Panama Canal, and Alaska.

The participants were designated as working group and spent considerable time reviewing, interpreting the survey results, and developing recommendations.

Recommendations were compiled for new requirement documents for:

- 1) Development of a new style survival vest to include provision for LPU Life Preserver for general use by aircrewmembers.
- 2) Development of advanced (1990) State-of-the-art survival components for survival vests.
- 3) Development of a smoke signal for day use to be used in individual survival vests.

4) Development of a new First Aid Kit for survival vests that contain no non-medical items.

5) Development of an individual illuminous identification component for kits and vests.

6) Development of new type survival food packets.

7) Development of new type survival packaging to withstand crash impact.

8) Development of an individually worn survival kit other than vest type - similar to the Survival Kit, Lightweight, Individual.

9) Development of an advanced (1990) state-of-the-art First Aid Kit for Survival Kits/Vests.

#### B. Passenger Survival Support

The working group, in a positive move for change, took into consideration the survival needs of passengers in all Army aircraft. This is an area overlooked in the past and not covered by the present-day survival kits.

The group recommended development of passenger survival kits for 2 to 6 passengers for all aircraft flight applications in the following environments:

1) Cold Climate

2) Hot Climate

3) Overwater

4) Arctic Region

#### C. Tri-Service Conference on Survival Kit and Vests (Appendix B)

This conference was held at the US Army Natick Research and Development Command, March 20 - 21, 1979.

The objective of the conference was to review Army requirements with the other Services and the Canadian Armed Forces, and to determine whether their development programs could meet the needs of the Army Aviator. Both the Navy and the US Air Force have on-going survival vest programs that show some promise for meeting some of the Army requirements.

Search and Rescue personnel were asked to review their activities with the intent of answering the following questions:

- 1) How is the present equipment serving the accident survivor?
- 2) How can it be improved?
- 3) What rescue and recovery procedures should be reviewed and improved?

#### (1) SURVIVAL/MEDICAL EVACUATION

Dr. Murray Hamlet during his presentation on Survival/Medical Evacuation, pointed out that he believes survival depends on major psychological factors that become involved during an aircrewmember's survival which have been ignored for years:

"These factors are; the determination to live and the alleviation of fear. Those people who say, 'I am not going to let this get to me,' whatever it is, are the ones that will survive. Those people who are self-defeatist and who are rapidly overcome by the situation they're in, are the ones who go on down hill and die. The egomaniacs don't die. After that, there are three main things; ingenuity, the equipment you have available, and your perseverance. We are talking about mostly psychological factors here. The best aid kit, the best survival vest in the world in the hands of the novice, is worthless. How are we going to develop in this individual, who has this vest on, the feeling of security? You must instill some confidence in him that the equipment works, that what he needs to survive in that environment is there. He must have some training with it, to know that it works. We have to prevent him from doing foolish things in a survival situation. The equipment you provide for him in the vest or whatever must include something that will allow him to stabilize himself psychologically and conserve his body heat until someone comes to get him."

#### (2) SEARCH AND RESCUE IN SEA

The USAF Search and Rescue Personnel indicate the successful evasion was attributed to the following factors:

- 1) Being away from the crash sight where the search is most intensive.
- 2) Moving at dusk and dawn.
- 3) Being able to select effective concealment locations.

- 4) Camouflage all marks so one's presence would be unknown.
- 5) Proper protection of required survival items, especially the radio batteries.

Those who were able to evade for more than a few hours found the most useful survival equipment to be:

- 1) The survival radio
- 2) Penguin flare - or gyro jet, that placed a smoke signal above the tree cover.
- 3) Signal flare
- 4) Detailed useful scale, escape, and evasion map
- 5) Compass
- 6) Food and water - some type of container for water refills
- 7) A .38-cal revolver

However, most chose to dispose of the revolver, or surrender it without incident.

### (3) OVERWATER SEARCH AND RESCUE

The Coast Guard rescue presentation indicated training as one of the major needs of survivors (military and civilian). This training should include the proper use of signal equipment such as smoke signals, mirrors, flares, and dye markers, and how to conserve these items until a rescue plane or vessel are very close by and can be seen, and thus not wasted. Personnel should only carry those survival items that are absolutely necessary and leave behind any nice-to-have items. These add to bulk and overload the survivor, causing fatigue at a time the survivor needs all of his strength.

Sea sickness will be a problem during a water crash survival environment. Personnel in rafts should be aware that the rotor wash from the helicopter will turn over a life raft and it is best to leave the raft to enter the rescue basket. Also let the rescue equipment ground itself in the water to discharge any static electricity that may have built up in it before it touches the water. An estimated 800,000 volts of static build-up is generated by a CH-53E Helicopter in a Hovering position.

#### (4) US AIR FORCE AND US NAVY PROGRAMS

Both the USAF and USN have active survival vest development programs. A number of the features in these vests can be applied to the proposed US Army survival vest design.

Each service has a specific need for their individual survival vest application, and due to this need, there are variations in the end item. The vest for all three services will be designed to retain an armor insert inside of a fragmentation carrier, the vest design will be similar, but the type of survival component pockets and location on the vest will be dictated by the aircraft types the vest is to be worn in, by the restraints placed on the vest by the motion of aircraft controls and mainly by the operational performance of the wearer.

#### (5) CANADIAN ARMED FORCES SURVIVAL EXPERIENCES

Members of the Flight Safety Office, the Aerospace Life Support Equipment Management Office, and the National Defense Headquarters participated in the conference and provided attendees with an overview of the Aviation Life Support Equipment problems in their climatic region. It was indicated from their experience that seventy percent of all survivors received some sort of injury during survival. Survival Kits installed in accident aircraft were found insufficient for survivor needs. Rapid rescue time indicated they are over-supplying survival needs, however, they would not at this time recommend reducing them.

Problem areas were identified such as survival equipment hindering the survival process and over-emphasizing food over water.

Survival down time has been reduced from days to hours and their design guide will detail 72 hours as its guide.

#### (6) CONFERENCE WORK SHOPS

The work shops considered all survival vests, kits and their components, materials, designs and application to the survivors essential need to survive an aircraft crash. A new survival approach was developed as a direct result of the willingness of the conference participants to actively take part and share with the conferees their survival experiences in crash recovery, rescue, training, maintenance, and aviation life support equipment management.

This survival approach recognized the need of the survival vest to provide the survivor with essential day and night signal and communications components, remove all other non-necessary components from the vest, provide two large component pockets for use of essential environmental survival components particular to the environment where the vest is to be used, and provide a means for attaching an under arm life preserver and hook up ring for the rescue helicopter hoist. The new survival vest approach would compliment the survival kit.

The new approach for the survival kit will be to provide a secondary extended survival support to the aircrewmember and passengers as a group per aircraft type and not individually as is being done presently. Each aircraft will carry a kit equipped for the total passenger and crew load. This kit will be supplemented by an environmental survival kit for areas such as Alaska, and Tropic areas and during overwater flights.

This new approach was developed from the participant's collective input to the conference that identified improvements in crash fires which now permit survivors the opportunity to return to a crashed aircraft and retrieve the aircraft survival kit. It was also pointed out by medical personnel that recovery time is now six hours on the average. However, everyone agreed 12 hours was a more realistic time approach for development proposals. Packaging processes have now improved to the point that vacuum pressure packing allows bulky items to be packaged in much smaller volume.

#### (7) PROPOSED SURVIVAL KIT AND VEST DEVELOPMENT PROGRAMS

Letter Requirements have been drafted, outlining the need for new development programs. These were initiated for the following items in response to the survey and conference on survival kits and vests:

1) An Aircrew Survival-Armor-Recovery Vest that will provide essential day and night signal and communication equipment, attachment for an underarm life preserver, and a hook-up ring for immediate rescue by helicopter.

2) A Survival Environment Packet that will be used with the Vest and provide essential signal and medical mini-self-aid items applicable to the environmental region the vest is to be worn in.

3) An Aircraft Module Survival System which will provide for an extended survival system that will complement the survival vest. This system will provide the aircraft crew and passengers (2- and 5- people configuration) with a basic aircraft survival module that can be built upon with other environmental modules (Arctic Overwater or Hot Climate) to meet the aircraft crew and passengers flight mission environmental survival emergencies.

It is expected that these development programs will achieve the following goals:

1) Eliminate unnecessary, nice-to-have survival components from the survival vest.

2) Reduced bulk on the vest which in turn will improve emergency egress following a crash and will eliminate interference with aircraft operational controls.

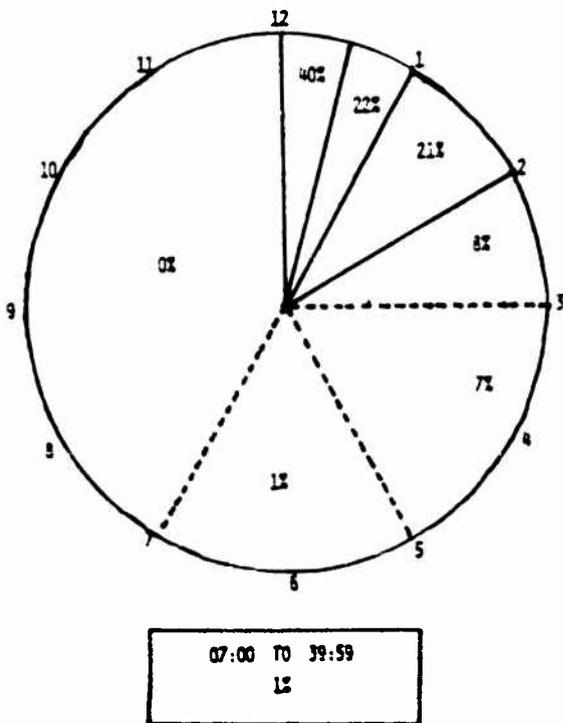
3) Improve the survivor's chances of being located and recovered by using only essential signal and communication items in the vest.

4) Provide the immediate survivor mini-self-aid capabilities with the use of only essential environmental survival packets for the vest.

5) Eliminate duplication, reduce bulk and weight, and increase aircraft mission capabilities with the use of multi-person aircraft survival modules.

6) Provide a survival vest and survival environmental packet to meet immediate survival needs and aircraft modular survival system to provide extended survival capability to meet the requirements of the aircrewmember. (Table 17)

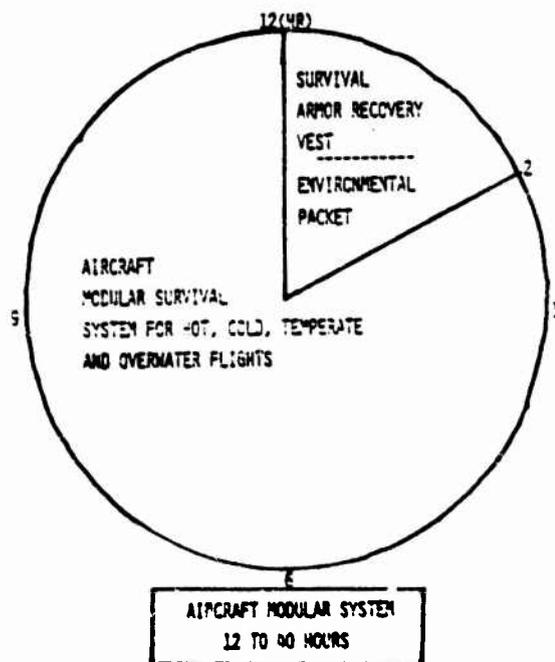
ELAPSED TIME (HRS) FOR COMPLETED RESCUES



07:00 TO 39:59  
12

234 AVIATORS 1 JAN 72 - 7 MAR 79 - (100%)

PROPOSED SURVIVAL SUPPORT TO AIRCREWMEMBERS DURING RESCUE



AIRCRAFT MODULAR SYSTEM  
12 TO 40 HOURS

TABLE 17

D. TRADOC/NARADCOM Joint Working Group Meeting at NARADCOM, 11-12  
September 1979 (Appendix C)

This group met at NARADCOM, 11-12 Sep 79, and developed and defined the technical, survival, and environmental requirements that the Survival Armor Recovery Vest, the Survival Environmental Packet, and the Aircraft Modular Survival System would be required to meet. Survival and environmental components were defined for temperate, hot, cold, and overwater environments, and detailed how they would be used and assigned to the Survival Environmental Packet, and the Aircraft Modular Survival System.

These requirements were drafted as Letter Requirements for:

Survival Armor Recovery Vest  
Survival Environmental Packet  
Aircraft Modular System

These documents were reviewed and redrafted by the US Army Aviation Center, Ft. Rucker, AL and are in the process of coordination among US Army Aviation Agencies, USAF, US Navy, US Marine Corps, and the US Coast Guard.

This document reports research undertaken at the US Army Natick Research and Development Command and has been assigned No. NATICK/TR-80/012 in the series of reports approved for publication.

APPENDIX A

MINUTES OF 14-15 NOVEMBER 1978  
SURVIVAL KIT/VEST CONFERENCE  
ST. LOUIS, MO

MINUTES OF AVIATION LIFE SUPPORT EQUIPMENT  
MANAGEMENT STEERING COUNCIL

Survival Kit/Vest Conference

1. The Survival Kit/Vest Conference met on 14 - 15 November in the Mart Building, St. Louis, MO. This conference was hosted by the TSARCOM project officer for ALSE.
2. List of Attendees - Inclosure 1: Agenda - Inclosure 2.
3. The ALSE PO for TSARCOM Mr. A.B.C. Davis opened the meeting by welcoming those present and designating the attending group as a working group for this conference. He then designated the undersigned as chairman.
4. Presentation of the Survival Kit/Vest Survey Report was delivered by the undersigned to those in attendance. This was a compressed summary of the report results. This presentation provided the group with a review of accident data, on-site problems, and recommendations, medical status of food and drugs and supply recommendations. Discussions were held on the presentations but were held to a minimum. A detailed review of the report results was scheduled for 15 November 1978.
5. LTC Bruce Chase, TSGO, presented an up-date of the Medical activities and he did apologize for the tardiness of his input to the report. He asserted that USAARL, Ft. Rucker, AL has been tasked to review the food and drug problems and also the need for nomex material in the survival vest in view of the reduction of burns during aircraft accidents. He further stressed the need for change in kits and vests for a reduction of components and weight. This should be achieved with the development of a kit to meet realistic recovery time elements.
6. Mr. Edward Barnicle, NARADCOM, presented a background on the development activities that lead to the development of the present day survival kits and vests. He also was instrumental in resolving questions raised during this conference concerning kits and vests.
7. A continuous reference was made during the conference to the problems of getting corrective action thru the use of EIR's and suggestions. These problem areas were mainly addressed by CW3 Gruhn, Ft. Benning, CW3 Hintze, Ft. Bliss, CW3 Hines, Ft. Bliss and CW2 Wells, Ft. Bliss.
8. Mr. William Jones, FORSCOM, presented a review of what he and his visiting FORSCOM inspection team found in Hawaii, Panama Canal, and Alaska. He indicated he found the ALSE equipment and their support program to be in a better position to support the aircrewmember than those located in the states in general.
9. On the second day of the conference, the survey report was reviewed item by item. Open discussions were held and recommendations drafted for submission.

to the 15 November 1978 ALSE Council meeting.

10. The following recommendations for requirement documents were drafted for submission to the ALSE Council:

- a. Development of a new style survival vest to include provision for LPU life preserver for general use of aircrewmembers.
- b. Development of advanced (1990) State-of-the-Art Survival Components for Survival Vests.
- c. Development of a Smoke signal for day use to be used in individual survival vests.
- d. Development of a new First Aid Kit for Survival Vests that contains no non-medical items.
- e. Development of an Individual Illuminous Identification component for kits and vests.
- f. Development of a new Crash/Survival evacuation knife.
- g. Development of a Multi-Passenger Kit and Individual Crew Survival kits for use in Attack, Observation Scout and Utility helicopters.
- h. Development of a Multi-Passenger Overwater Kit and an Individual Crew Overwater Survival Kit for Attack, Observation, Scout and Utility helicopters.
- i. Development of new type survival food packets.
- j. Development of new type survival packaging to withstand crash survival.
- k. Development of a Cold Climate kit and an Artic Region Survival kit. (Multi-Person and Individual).
- l. Development of an individually worn survival kit other than vest type. Similar to the Survival kit Lightweight, Individual.
- m. Development of an advanced (1990) State-of-the-Art First Aid Kit for Survival Kits/Vests.

11. Recommend the ALSE Management Steering Council request TRADOC to initiate action on joint working groups to:

- a. Evaluate the Survival Kit/Vest Working Group recommendations.

b. Verify the needs.

c. Initiate appropriate requirement documents for development and/or replacement of the end items.

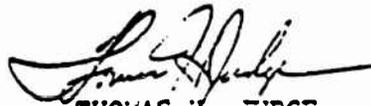
12. Recommend immediate Concept Evaluations be considered for the Survival Vest and overwater kits to determine compatibility with Helicopter flight environment such as the survival vest with different pocket locations and designs and the location of a one man raft kit on the individual.

13. Recommend the Council host a military Aviation Life Support Equipment Conference at Ft. Rucker, St. Louis or NARADCOM. This conference should include as participants members of USAF, Navy, Marines, Coast Guard and the Canadian Armed Forces. ALSE Officers. The objective of the conference would be to display and demonstrate Aviation Life Support Equipment used by each services and the exchange of information. This exchange of information and ideas could lead to the US Army evaluation of other service ALSE to determine their suitability in resolving some of this survey's problem areas.

14. Finally, recommend the council review, finalize and approve the draft survey report for publication. Finalization would include this presentations, recommendations and the proposed follow-up actions of the Council.

15. ACTIONS TO BE TAKEN:

The above minutes, comments and recommendations will be presented to the 16 November 1978 meeting of the ALSE Management Steering Council for approval and appropriate action.



THOMAS H. JUDGE

Chairman

Survival Kit/Vest Working Group

AVIATION LIFE SUPPORT EQUIPMENT  
MANAGEMENT STEERING COUNCIL  
SURVIVAL KIT/VEST CONFERENCE  
14 - 15 NOVEMBER 1978  
ST. LOUIS, MO

AGENDA

14 November 1978

- 0845 - WELCOME - INTRODUCTION
- 0900 - PRESENTATION OF SURVEY REPORT ON SURVIVAL KITS/VESTS
- 1100 - MEDICAL REPORT UP-DATE
- 1130 - LUNCH
- 1230 - REVIEW OF DEVELOPMENT BACKGROUND FOR PRESENT DAY  
KITS AND VESTS
- 1300 - REVIEW OF EIR'S AND SUGGESTIONS
- 1330 - OPEN DISCUSSION

15 November 1978

- 0830 - REVIEW OF SURVEY PROBLEMS AND RECOMMENDATIONS FOR  
EACH KIT AND VEST
- 1130 - LUNCH
- 1230 - CONTINUE REVIEW OF SURVIVAL KITS AND VESTS
- 1430 - DRAFTING OF RECOMMENDATIONS FOR SUBMISSION TO  
16 NOVEMBER 1978 MEETING OF ALSE MANAGEMENT  
STEERING COUNCIL

SURVIVAL KIT/VEST CONFERENCE

November 14, 1978

<u>NAME</u>	<u>ORGANIZATION</u>	<u>PHONE NO.</u>
Linda Apponyi	DRCPO-ALSE	698-3241
Edward J. Barnicle	NARADCOM	955-2211
Raymond Birringer	USAAVNC	558-5272
†Bruce Chase	OTSG	227-2743
Leonard M. Cuchna	AVRADCOM D & E DIR	698-6606
†A. B. C. Davis, Jr	DRCPO-ALSE	698-3241/91
Jim Dittmer	DRSTS-MAPL	
COL. Farrni		
LTC. Harry L. Fraser	AVRADCOM, ASTIO-(BRDAV-N)	698-6100
Ray Gilstead	USAR TSARCOM DRSTS-STS(2)	698-5831
Lawrence M. Gruhn	USAIC, Ft. Bragg, GA	835-2425
CW4 Charles Haynes	DRCPI-AAH-LM	698-6061
CW3 Dan Hines	USAADC - Ft. Bliss	978-9002-8086
CW3 H. D. Hintze	AFVF-AVS - Ft. Bliss	978-8464-8613-8113
Gerald L. Johnson	USAARL - Ft. Rucker	558-7112
William D. C. Jones	FORSCOM Ft. McPherson, GA	588-3343
Thomas H. Judge	NARADCOM	955-2461
Ed Mark	AVRADCOM D & E DIR	698-6066
Bob Matthews	AVRADCOM D & E DIR	698-6066
Jerry Nowicki	NGB-AVW-1	584-2029
Don Sabo	AVRADCOM D & E DIR	698-6066
CW2 Richard P. Wells, Jr.	CO. C (EM AVN (FVD) Ft. Bliss	978-8730

\*Note: ALSE STEERING COUNCIL

APPENDIX B

MINUTES OF THE TRI-SERVICE CONFERENCE  
OF SURVIVAL KITS/VESTS  
HELD 20-21 MARCH 1979  
US ARMY NATICK RESEARCH AND DEVELOPMENT COMMAND  
NATICK, MA



DEPARTMENT OF THE ARMY  
US ARMY NATICK RESEARCH and DEVELOPMENT COMMAND  
NATICK, MASSACHUSETTS 01760

REPLY TO ATTENTION OF:  
DRDNA-VCA

11 April 1979

SUBJECT: TRI-Service Conference on Survival Kits/Vests Minutes

SEE DISTRIBUTION

1. Minutes of the TRI-Service Conference on Survival Kits/Vests are attached.
2. The TRI-Service Conference of Survival Kits/Vests was held 20 - 21 March 1979 in the US Army Research Institute of Environmental Medicine conference room. It was hosted by US Army Natick Research and Development Command, Natick, MA.
3. Should additional information be required, your point of contact is Mr. Thomas H. Judge, Autovon: 955-2461 or Commercial: (617) 653-1000, Ext. 2461.

FOR THE COMMANDER:

ROBERT S. SMITH  
Chief, Clothing and Equipment Division  
Clothing, Equipment and Materials  
Engineering Laboratory

1 Incl  
as

DISTRIBUTION:

Cdr, US Coast Guard Air Station, ATTN: ASMC D. Gelakoska, Otis AFB, MA  
HQ, 10th Special Forces, ATTN: L. C. Balboni, Ft. Devens, MA 04133  
Cdr, US Coast Guard, ATTN: G-OSR-4/73 (CWO S. Maness), WASH, DC 20590  
Cdr, Naval Air Development Center, ATTN: D. DeSimone, Code 6002,  
Warminster, PA  
Cdr, Naval Air Systems, ATTN: AIR-340B (Mr. Fredrizzi), WASH, DC  
HQ, FORSCOM, ATTN: AFOP-AV (Mr. W. Jones), Ft. McPherson, GA  
HQ, 1st US Army, ATTN: AFKA-01-V (MAJ. W. Malinovsky), Ft. Meade, MD  
HQ, TSARCOM, ATTN: MAPL (Mr. J. Dittmer), 4300 Goodfellow Blvd.,  
St. Louis, MO 63120



SUBJECT: TRI-Service Conference on Survival Kits/Vests Minutes

## Distribution Continued:

HQ, Company USAC, ATTN: CPT R. Barrows/Christopher Lang, Ft. Devens, MA  
HQ, ARRI, ATTN: Mr. Silva, Ft. Devens, MA 04133  
Cdr, DARCOM Readiness Cmd, ATTN: P.O. ALSE (Mr. Davis), P.O. Box 209,  
St. Louis, MO 63166  
HQ, ASD/AELS, ATTN: Mr. K. Troup, Wright-Patterson AFB, OH  
HQ, 102 Ftr Inc Wing, MA Air National Guard, ATTN: MAJ P. Vergados,  
SGT R. Bernardo, LT H. Reitzig, Otis AFB, MA  
Cdr, US Coast Guard Training Station, ATTN: MPCO (C. J. Dugan), Mobil,  
AL 36608  
HQ, USAARI, ATTN: Mr. David Ruf, Otis AFB, MA  
HQ, Company USAF, ATTN: MAAF (J. Fitzgerald), Ft. Devens, MA 04133  
HQ, CT ARNG, CT TARS, P.O. Box 1, ATTN: Mr. R. White, Trumbull AP,  
Groton, CT  
National Guard Bureau, ATTN: NGB-AVN-L, (WO J. Nowicki), Edgewood  
Arsenal, MD 21010  
HQ, 222nd Avn Bn, ATTN: AFTZ-SO (CPT D. Gibson), Ft. Wainwright, Alaska  
Cdr, US Army Safety Center, ATTN: Mr. L. D. Sands, Ft. Rucker, AL 36362  
HQDA, ATTN: DASG-PSP (LTC B. Chase), WASH, DC  
HQ, TRADOC, ATTN: ATORI-AV (MAJ J. M. Peterson), Ft. Monroe, VA  
Cdr, USA Combat Development Activity, ATTN: ATZLCA-AL (CPT P. Webb/T. L.  
Duncan), Ft. Richardson, Alaska 99505  
Cdr, US Army Materiel & Mechanics Research Center, ATTN: G. Harris,  
Watertown, MA  
Cdr, US Army Aeromedical Research Lab., US Army Aviation Center,  
ATTN: SGR-UAE (S/SGT G. Johnson), Ft. Rucker, AL 36362  
Cdr, 439 TAW, ATTN: DOOL (Mr. J. Sambor), Westover AFB, MA  
Cdr, US Marine Corps Development Center, Air Branch Fire Power Div.,  
ATTN: D092 M/SGT C. Haas, Quantico, VA  
Cdr, US Army Aviation Center, ATTN: ATZQ-D-MS (Mr. Birringer), Ft.  
Rucker, AL 36362  
HQ, Readiness Group, Devens Operation, ATTN: David Hassen, SGT Lewis,  
Ft. Devens, MA 04133  
HQ, ARRS, ATTN: DOQL (MAJ Steven Howell), Scott AFB, IL  
National Defense Headquarters, ATTN: DAES/DFS (LTC J. Wallington, MAJ  
Cockburn, CPT Martella, Mr. L. D. Reed, Mr. J. Firth, WO P. J. Van-  
denburg), Ottawa, Ontario K1A0K2  
Cdr, 26 AVN, BN, ATTN: AASF (MAJ T. Cox/SGT Quinton), Otis AFB, MA  
HQ, USAR ASF, ATTN: Mr. J. Chubway, R. A. Petty, A. J. Bevilacque,  
MAJ C. O. Locklear, Stewart Air Field, Newburgh, NY  
Cdr, Company A 25th Combat Aviation Battalion, ATTN: CW3 J. Vasko,  
Scofield Barracks, Hawaii 96857  
LTC Richard Nanartowich, State Aviation Officer, 905 Commonwealth Ave.,  
Boston, MA 02215  
Dr. Ackles, Canadian Embassy, 2450 Massachusetts Avenue N.W., WASH, DC  
Cdr, Army Aviation Support Facility, ATTN: Mr. LaBell, State Military  
Reservation, Concord, NH 03301  
M/Sgt L. R. Rudolph, 91 Rockingham Drive, 509 BW, Pease AFB, NH 03801

MINUTES  
USAAVNC/USANARADCOM  
TRI-SERVICE CONFERENCE  
ON  
SURVIVAL KITS AND VESTS

1. The conference was held 20 - 21 March 1979 in the US Army Research Institute of Environmental Medicine conference room. The conference was requested by the US Army Aviation Center, Ft. Rucker, AL and hosted by US Army Natick Research and Development Command, Natick, MA.
2. List of attendees - Inclosure 1.
3. Agenda - Inclosure 2.
4. Welcoming Address, LTC Donald J. Marnon, Deputy Commander, USANARADCOM.

LTC Marnon, welcomed the conference attendees to NARADCOM. He then reflected upon his ranger experiences that pointed out the need to insure that crewmembers carry their survival equipment when they leave on a flight mission. He related to an aircraft accident where the crew did not carry their equipment and seriously delayed rescue of the crash survivors.

5. Keynote Address: Survival-Medical Environment, LTC Franklin J. McShane, Acting Commander, USARIEM

LTC McShane, greeted the conferees and made apologies for Colonel Dangerfield's sudden change of plans that prevented him from presenting the keynote address. He then introduced Dr. Ralph Goldman, who delivered the address.

Dr. Goldman went on to describe the keys to survival; attitude first, being located second, and recommends that the conference give thought to far out ideas for the survivor to attract attention to their location. Third is water, food should not be the problem for survival. He described the activities of USARIEM and how there facilities could assist in reviewing the needs of the survivor in frost bite, raft insulation, heat loss and many other areas that effect the survivor in the Crash Survival Environment.

6. Conference Objective and Survey Review; Mr. Thomas H. Judge, USANARADCOM, Chairman

The conference objectives and needs were detailed to the attendees. A summary of the recently completed survey of the US Army Aviation Community on Survival Kits and Vests was presented along with proposals for programs to take corrective actions. The chairman also enlisted the attendees support in the conference work shops. The work shops would develop requirements to improve the proposed corrective actions for application of advanced state-of-the-art technologies.

7. Search and Rescue - Medical Evacuation; Dr. Murray P. Hamelt,  
DVM USARIEM

Dr. Hamelt in his presentation, emphasized that priority should be given to locating and stabilizing the accident survivor, then evacuation should be over a predetermined route and the survivor should be medically managed during recovery from the accident site. Verification of injuries is important and must be determined along with the urgency of the rescue to avoid risking people unnecessarily. To aid in this area, medical radio frequencies would be of great help along with aids in the vest to allow the survivor to stabilize himself until he is recovered.

8. Search and Rescue Experiences in South East Asia, Major Steven Howell,  
USAF, AARS, Scott AFB, IL

Major Howell explained the function and mission of the USAF Rescue Organization. He then related to the rescue of LT Ferguson in SEA, that was classified as one of the greatest rescue efforts in South East Asia. It was further regarded as one of the greatest training exercises for both sides of the conflict, due to the amount of effort expended on both sides during the rescue. He then presented a film on air-sea rescue efforts of the USAF.

9. Water Survival Experiences, CW4 J. Vasko, 25th Infantry, Hawaii

CW3 Vasko explained in detail the organization of Aviation Life Support Equipment shops and training programs for flight personnel. The problems of maintaining equipment and procuring services for the assigned equipment. He displayed equipment they had designed and modified to meet their need for overwater survival following a crash. The cooperation between the US Army and Army National Guard were noted as they both share the same equipment problem areas. He emphasized the need for trained people and funding for support of Aviation Life Support Equipment assigned aircrewmembers.

10. Alaska Aircrew Cold Region Conference, CPT P. Webb, TRADOC CDC,  
Ft. Richardson Alaska,

This presentation outlined the commitment of the CDC organization to the cold region development of equipment to protect aircrewmembers in the cold region. Present clothing and equipment are unsuitable for this region. Research was initiated to up-date cold region clothing and equipment thru conferences, that were attended by all services including the National Guard units. This effort set out to establish a standard development program for cold region equipment. The conference concluded that ALSE council be adopted in Alaska to coordinate training maintenance and development of cold region needs in the Alaskan region. The conference recommended initiation of Cold Region Clothing and Equipment requirement documents. Aircraft Survival kits are preferred over the Individual Survival Kit in all types of aircraft.

11. Cold Weather Survival User Experience, CPT D. Gibson, 172 Inf. Bgd., Ft. Richardson, Alaska

CPT Gibson detailed the 172 Division activities, Operation "Jack Frost 1979" and of the Army National Guard Eskimo Scout Battalion. He emphasized clothing, survival equipment and aircraft heat requirements that reduce the productive load carried on aircraft and high altitude missions require oxygen systems installed in the aircraft. Fire fighting is one of the extra activities conducted in support of the Alaskan region. A survey was conducted in Alaska prior to his leaving for this conference on ALSE and it revealed the lack of trained personnel, need for ALSE schooling at USAVNC and the requirement for an MOS for ALSE. They need a speed-up in supply of equipment for survival needs and he concluded that a number of deficiencies were found with the equipment they have received to date.

12. Survival Experience of Canadian Armed Forces, LTC J. Wallington, MAJ D. Cockburn, CPT D. Martella, W.O. Vandenburg, Mr. J. Firth, National Defense Headquarters, Ottawa, Ontario Canada.

LTC Wallington, Aerospace Life Support Equipment Management, defined the activities of his organization, the Flight Safety Office and Defense Institute of Environmental Medicine.

Major Cockburn, Flight Safety Office, reviewed with conference attendees survival experiences in ejection, ditching outside of the envelope ejection experience. He further detailed other accident survival incidents in winter and summer. Seventy percent of all survivors received some sort of injury during survival. Survival kits installed in the accident aircraft were found insufficient for survivor needs. Rapid rescue time indicated we are over supplying survival needs, however, he would not recommend reducing them.

W.O. P. J. Vandenburg, Aircraft Flight Support Group, explained the Flight Survival Support equipment presently being used by the Canadian Armed Forces Flight Crews. He further identified problem areas such as survival equipment hindering survival process, and over emphasizing food over water. Survival down time has been reduced from days to hours and design guide will detail 72 hours as its guide for survival equipment.

CPT D. Martella explained various types of survival equipment used by the Canadian Armed Forces, Flight Crews and the development of survival equipment.

Mr. J. Firth, DCIEM, described the thermal protective jacket concept using infra-red photography to determine heat loss and detailed the flotation advantages such as; the oral and possible self-inflating bladders with future addition of automatic and manual inflator interface. Jacket has hoist pick-up ring and strap. The jacket has tendency of turning the wearer in an up right floating position. Recommend that the fetal position should be used to retain heat.

13. Search and Rescue Overwater Experiences, MPCO D. J. Dugan, US Coast Guard, Mobil, AL, Aviation Training Center

Chief Dugan outlined the training programs for aircrew personnel, types of equipment used for rescue operations and survival equipment, survival vests, life rafts and wet suits used by the Coast Guard aircrew rescue personnel. He further illustrated thru slides, the problems found in locating downed personnel, identifying signal equipment as one of the most important items needed during recovery. He emphasized that most of their activities revolve around the rescue of civilians more than military personnel. He noted that the Coast Guard does not issue equipment to the individuals for they have found the individual will not bring them in for inspection so they are issued as needed. Their new wet suit has about 30 lbs of buoyancy built into it. He related details of the two recent helicopter crashes off Cape Cod.

14. US Navy Survival Components and Rafts, Mr. D. DeSimone, Naval Air Development Center, Warminster, PA

Mr. DeSimone described the mission of the Naval Air Development Center, the excellence of the staff, the development programs in survival components, escape systems survival devices and life rafts. He detailed the eight year development process in designing, developing, and producing a new life support system for the US Naval aircrewmember and the coordinated development programs with the Army and Air Force. He related his experiences with the TRI-Service Working Agreement and then presented a film on development of a mini-boat used with Survival Vests.

15. USAF, Survival Kits and Vests, Mr. Kenneth Troup, Wright-Patterson AFB, OH

Mr. Troup defined the USAF Life Support Equipment SPO, this program and how they get involved in developments, when the item is about to be available in two years. Their total development time from exploratory development to production is five years in duration. He explained the AF development process for new hardware, life preservers, life rafts, aircraft container for 25 man rafts, vacuum packing of rafts, automatic life preserver and flexible water container. He maintained that the Air Force does not consider survival food important and are stressing the importance of water over food.

16. Survival Food Packets, Food Engineering Laboratory, NARADCOM, Ms. Alice Meyer and Dr. Donald E. Westcott.

Alice Meyer presented the historical background of the survival food packet beginning in World War II and its progress to present day requirement.

Dr. Westcott continued the presentation detailing the real world problems of obtaining and procuring food packets. He explained the types of foods to meet the protein requirements and identified different food products to meet these needs. Lack of interest in industry and a very limited commercial market to produce these items and develop methods for producing the small amounts of food packets, food bars, which are not shelf items readily available, have increased the cost considerably.

17. Aviation Life Support Equipment Management, Mr. William Jones, HQ FORSCOM, Ft. McPherson, GA

Mr. Jones detailed the FORSCOM mission in Alaska, Panama Canal, Hawaii and CONUS. He maintained that FORSCOM is the largest user of ALSE. ALSE Management is assigned to Aviation Safety. There is a command failure in the area for hands on maintenance of ALSE. This equipment has been made a permanent part of FORSCOM's to provide the user with management programs to support the field organizations needs. FORSCOM sets the objectives and then periodically goes to the field to determine how well these divisions meet these objectives. Alaska encourages training for aircrews and Hawaii has their own training program that is considered excellent. Some progress has been made, some management exists in this area and is done mostly by those in aviation safety.

18. US Army National Guard ALSE, Mr. J. Nowicki, National Guard Bureau, Edgewood Arsenal, MD

Mr. Nowicki defined the National Guard Fleet of Aircraft and their mission in all 50 states and territories. Summer encampment in W. Germany. The management, maintenance and inspection of ALSE is compounded by lack of personnel assignments and lack of equipment. No new personnel can be obtained for ALSE maintenance. ALSE has a priority of four (4). The National Guard has to do what it can with what is has in the ALSE area. Law suits are creating problems where personnel do not want to get involved in areas where they have not been trained, where they could possibly be held responsible for any accident. Recommends that problem areas not be hidden from the Inspector General during their inspections. **It is possible these inspections could help in resolving some of the problems with ALSE inspections, maintenance, and supply support.**

19. Survival First Aid Kit, LTC Bruce Chase, Surgeon Generals Office, Washington, DC

LTC Chase recommended reviewing the hard box type container and expressed his ideas concerning the medical components in the present survival kits.

#### 20 Work Shops and Recommendations

a. The Survival Vests work shop participants considered all Survival Vests, their materials, designs, and component needs. A new approach was developed for survival component needs. This approach delt

with the correlation of the Survival Vest need with the Survival Kit. The Vest will be designed to contain only essential signal equipment, rescue hoist pick-up, side webbing adjustment and two empty pockets for use of essential environmental survival components particular to the environment where the vest is issued. All components will be restricted to essential needs and simply packaged to permit a disabled person the opportunity to operate the component. This design approach is based on the information reviewed from search and rescue personnel, accident data and medical reviews, that have indicated:

(1) Most accident recoveries are completed within six hours, however, as a safety factor the design will use 12 hours as a recovery time.

(2) Most accidents no longer involve fires, and permit the crash survivor the opportunity to return to the crashed aircraft to retrieve the aircraft survival kit.

b. The Survival Kits were reviewed with the intent that they would compliment the survival Vest, design and the vest would do the same. This approach would deal with Survival Vests for primary unit and aircraft kits mounted in the aircraft with additional equipment for crewmembers and passengers. The new concept is based on the following:

(1) Most rescues are made within the first 12 hours.

(2) Helicopters no longer burn after crash.

(3) Breakthroughs in pressure and vacuum packing allow rafts, sleeping bags, tents, ponchos and tarpaulins to be packed in a much smaller volume.

#### 21. Closing Address by Dr. G. DeSantis, CEMEL, NARADCOM

Dr. DeSantis commented on the contents of the conference and thanked everyone for their support in coordinating the conference activities including the special efforts of the Coast Guard and the 10th Special Forces unit from Ft. Devens for their participation in the water rescue demonstration.

#### 22. Conclusions

a. The objectives of the conference were:

(1) To review the survival kits and vests we have today in all of the services.

(2) To determine how well they have supported the need of the aircraft accident survivor.

(3) What improvements are required to upgrade these kits and vests to meet tomorrow's survival needs.

b. The conference participants through their presentations, demonstrations, displays and discussions did provide the stimulus for new design concepts in survival kits and vests for future development, thus making the conference a success. The willingness of the conference participants to actively take part and share their survival experience in crash recovery, rescue, training, maintenance and management with others contributed to the success of this conference.

### 23. Actions To Be Taken

a. The US Army Aviation Center, has agreed to 15 May 1979 as the date for initiation of requirement documents to cover the proposed new survival vest, survival kit and component development programs.

b. All presentations will be typed as an appendix to the final edition of the US Army Survey Report of Survival Kits/Vests and distribution will be to all conference attendees.

2 Incls  
as

  
THOMAS H. JUDGE  
Conference Chairman

MEETING ATTENDEES

DATE: 20 &amp; 21 March 1979

PLACE: USARIEM

BUILDINGROOM NO. 133PURPOSE Survival Kit-Vest Tri-Service Conference

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Carl S. Haas	Air Branch Fire Power Div. MCDEC, Quantico, VA	D092	278-2006
Ray Birringer	Mat'l Dev. Div, Ft. Rucker	ATZO-D-MS	558-5272
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Charles E. Lewis	Readiness Group Aviation Team Ft. Devens, MA		256-2074
Steve Howell	HQ ARRS, Scott AFB, IL	DOQL	638-5871
LTC John Wallington	National Defence HQ Ottawa, Ontario K1A0K2	DAES	993-1745
CPT Dan Martella	National Defence HQ Ottawa, Ontario K1A0K2	DAES	673-2000
James Firth	Dep. National Defense	DCIEM	633-4240
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Robert H. Quinton	HHC 26th Avn. BM, Otis AFB	AASF	557-4233
James Fitzgerald	HQ CO USAF, Ft. Devens, MA	MAAF	796-3130
Robert G. White	CT. TARS, P.O. Box I CTARNG Trumbull AP, Groton CT	CT TARS	636-7915
Jerry E. Nowicki	National Guard Bureau	NEB-AVN-L	584-2029
Douglas Gibson	222d Avn Bn, Ft. Wainwright, AK	AFTZ-SO	352-5203
L. D. Sand	USA Safety Center Ft. Rucker, AL	USASC	558-3901
N. B. Chase	HQDA (DASG-PSP) WASH DC 20310	DASG-PSP	227-2743
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MEETING ATTENDEESDATE:PLACE:BUILDINGROOM NO.PURPOSE Tri-Service Conference

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ASMC Darell Gelakoska	USCG Air Station		968-4418

MEETING ATTENDEESDATE:PLACE:BUILDINGROOM NO.PURPOSE TRI-Service Conference

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R. F. Goldman	ARIEM	SGRD-UE-ME	955-2831
Thomas Cox	HHC, 26 AVN BN, Otis AFB	AASF	557-4233
D. J. Cockburn	National Defense HQ, ATTN: DFS Ottawa, Ontario K1A0K2	DFS	992-1979
S. G. Maness	US Coast Guard, ATTN: (G-OSR- 4/73), WASH, DC 20590		(202)426-1918
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MAJ Peter Vergados	102 FIW Otis AFB, MA	DOTSL	986-4616
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David Ruf	USAARI, Otis AFB		557-4107
Harry Dostourian	USA NARADCOM	DRDNA-VCC	955-2546
William Jones	USA FORSCOM	AFOP-AV	588-4116
LTC R. Nanartowich	MA ARNG, State Aviation Officer Boston, MA	PST-AV	881-1641

USAAVNC/USANARADCOM  
TRI-SERVICE CONFERENCE  
ON  
SURVIVAL KITS AND VESTS  
MARCH 20 - 21 1979  
US ARMY NATICK RESEARCH AND DEVELOPMENT COMMAND  
NATICK, MA 01760

PROGRAM AGENDA

20 March 1979

0800 - 0830	Registration
0830 - 0845	Welcoming Address, LTC Donald J. Marnon, Deputy Commander, USA NARADCOM
0845 - 0915	Keynote Address: Survival-Medical Environment, LTC Franklin J. McShane, Acting Commander USARIEM
0915 - 0945	Conference Objective and Survey Review, Chairman; Thomas H. Judge, USA NARADCOM
0945 - 1000	Break
1000 - 1030	Search and Rescue - Medical Evacuation; Dr. Murray P. Hamlet, DVM USARIEM
1030 - 1100	Search and Rescue Experiences in South East Asia; Major S. Howell, USAF AARS Scott AFB, IL
1100 - 1130	Water Survival Experiences, CW3 J. Vasko, 25th Infantry, Hawaii
1130 - 1230	Lunch
1230 - 1300	Alaska Aircrew Cold Region Conference, CPT Webb, Ft. Richardson, Alaska
1300 - 1330	Cold Weather Survival User Experiences; CPT Gibson 172nd Infantry Brigade, Ft. Richardson, Alaska
1330 - 1415	Survival Experience, Survival Design Guide, and Survival Equipment Designs; Canadian Armed Forces, LTC Wallington and three other co-speakers.
1415 - 1430	Break

20 March 1979

- 1430 - 1500 Search and Rescue Overwater Experiences; ASMC Darell Gelakoska, MPCO D. J. Dugan, US Coast Guard
- 1500 - 1530 US Navy Survival Components and Rafts, Mr. D. DeSimone, Naval Air Development Center, Warminster, PA
- 1530 - 1600 USAF Survival Kits and Vests, Mr. Kenneth Troup, Wright-Patterson AFB, OH

21 March 1979

- 0830 - 0930 Survival Food Packets, Food Engineering Lab, NARADCOM, Ms. Alice Meyer, Dr. Donald E. Westcott
- 0930 - 0945 ALSE Management, Mr. William Jones, HQ FORSCOM Ft. McPherson, GA
- 0945 - 1000 US Army Reserve National Guard, ALSE, Mr. J. Nowicki, National Guard Bureau
- 1000 - 1015 Break
- 1015 - 1200 Work Shops
- Survival Vest Development Recommendations: Mr. T. Judge, USA NARADCOM
- Survival Kits Development Recommendations: Mr. E. Barnicle, USA NARADCOM
- 1200 - 1300 Lunch
- 1300 - 1330 Air-Water Rescue Demonstration, US Coast Guard
- 1330 - 1400 Work Shop Recommendations
- 1400 - 1500 Tour of US Army Research Institute of Environmental Medicine Laboratories, Mr. John Breckenridge, USARIEM, Demonstration of Load Profile Analyzer with Survival Vests
- 1600 Conference Adjournment

Revised 16 March 1979

APPENDIX C

MINUTES OF 11-12 SEPTEMBER 1979  
JOINT WORKING GROUP MEETING  
HELD AT US ARMY NATICK RESEARCH  
AND DEVELOPMENT COMMAND  
NATICK, MA



DEPARTMENT OF THE ARMY  
HEADQUARTERS UNITED STATES ARMY AVIATION CENTER AND FORT RUCKER  
FORT RUCKER, ALABAMA 36362

ATZQ-D-MS

SUBJECT: TRADOC/NARADCOM Joint Working Group (JWG) for Aircrew Survival  
Armor Recovery Vest, Survival Environmental Packets and the  
Aircraft Modular Survival System Letter Requirements (LR's)

SEE DISTRIBUTION

1. A Joint Working Group convened at the Natick Aviation Research and Development Command (NARADCOM), Natick, Massachusetts, on Sep 11-12 79, to review and finalize the following requirement documents:
  - a. Survival Armor Recovery Vest (LR)
  - b. Survival Environmental Packets (LR)
  - c. Aircraft Modular Survival System (LR)
2. ATTENDEES: Inclosure 1.
3. AGENDA: Inclosure 2.
4. Working drafts of the subject LR's were reviewed by the Working Group members and a revised final draft of these documents was prepared (Inclosures 3, 4 and 5).
5. During the review of the draft documents, the following additional items and action agencies responsible were identified:
  - a. Funding Data - to be provided by NARADCOM.
  - b. Cost Assessment Annex - to be provided by USAAVNC/NARADCOM..
  - c. Rationale Annexes - to be provided by USAAVNC.
6. When this additional information is available, the USAAVNC will finalize the LR's for external coordination to the TRADOC/DARCOM Aviation Communities.

5 Incls  
as

  
RAYMOND BIRNINGER  
TRADOC/USAAVNC  
JWG CO-CHAIRMAN

  
TOM JUDGE  
NARADCOM AISE DEV  
JWG CO-CHAIRMAN

LIST OF ATTENDEES

SUBJECT: TRADOC/NARADCOM Joint Working Group (JWG) for Aircrew

Survival Armor Recovery Vest, Survival Environment Packets and the

Aircraft Modular Survival System Letter Requirements (LR's)

DATE: 11-12 September 1979

LOCATION: NARADCOM

BUILDING: USARIEM

ROOM NO. 133

NAME	ORGANIZATION	OFFICE SYMBOL	PHONE
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AGENDA

ALSE - JWC (DEV)

FOR

AIRCREW SURVIVAL ARMOR RECOVERY VEST, SURVIVAL ENVIRONMENTAL PACKETS  
AND  
THE AIRCRAFT MODULAR SURVIVAL SYSTEM

-HQ NARADCOM -

11-12 SEP 79

<u>TIME/DATE</u>	<u>SUBJECT</u>	<u>ACTION AGENCY</u>
<u>11 Sep 79</u>		
0830	INTRODUCTIONS	USAAVNC/NARADCOM
0845	REVIEW SURVIVAL VEST/KIT SURVEY RESULTS	NARADCOM
	REVIEW SURVEY RECOMMENDATIONS	USAAVNC/NARADCOM
	REVIEW DRAFT AIRCREW SURVIVAL ARMOR RECOVERY VEST	USAAVNC/NARADCOM
	RATIONALE ANNEX	ALL
1300	REVIEW ENVIRONMENTAL SURVIVAL PACKET LE	USAAVNC/NARADCOM
	RATIONALE ANNEX	ALL
1530	ADJOURN	
<u>12 Sep 79</u>		
0830	REVIEW AIRCRAFT MODULAR SURVIVAL SYSTEM	USAAVNC/NARADCOM
	RATIONALE ANNEX	ALL
1300	CONCLUDE REQUIREMENTS ANNEXES	ALL
1530	ADJOURN	

DRAFT LETTER REQUIREMENT  
FCR  
AIRCREW SURVIVAL ARMOR RECOVERY VEST

1. TITLE OF ITEM. Aircrew Survival/Armor/Recovery Vest

2. STATEMENT OF NEED.

a. A need exists to provide aircrew members with a survival vest that will: retain essential survival signal and communication components; provisions for attachment of a life preserver; a fragmentation protective carrier containing an armor insert; storage pockets for essential environmental (temperate, hot, cold, over water) survival components; and to provide a hoist pick-up attachment/harness that will attach to a rescue helicopter hoist cable-hook.

b. This item is required by FY 80.

c. CARDS to be assigned.

3. JUSTIFICATION.

a. Problem.

(1) There is a safety hazard with the present survival vest. The pocket design is extremely bulky, heavy and interferes with the operational mission of the aircrew member.

(2) In addition, the present vest design does not provide for:

(a) Retention of attachment of a life preserver.

(b) Retention of fragmentation protective carrier that contains an armor insert.

(c) An adequate pocket configuration for retention of survival components for temperate, hot, cold, over water environments as required.

(d) A hoist pick-up attachment/harness that will attach to a rescue helicopter hoist cable hook.

(e) Materials resistant to fire or flame.

b. The proposed Aircrew Survival Armor Recovery Vest will have a capacity for retaining essential survival signal and communications components, provisions for an attachment of a life preserver, a fragmentation carrier, redesigned pocket size for essential environmental survival components, rescue hoist pick-up attachment/harness fabricated with materials resistant to fire or flame.

#### 4. BASIS OF ISSUE.

a. The vest will be issued on a basis of one (1) per authorized aircrew member.

b. Vest will be issued in four sizes.

#### 5. PRINCIPAL CHARACTERISTICS.

a. Performance Characteristics.

(1) The vest and pocket design shall not create injury hazard and shall not interfere with access to and operation of flight controls or emergency and crash egress.

(2) The vest shall be compatible with:

(a) Cockpit and crew station geometry, to include optical relay tubes and telescoping sighting units.

(b) Seats and restraints systems.

- (c) Flight clothing and all other life support equipment.
- (3) The vest design shall have provisions for:
  - (a) Single hand side adjustments.
  - (b) An integral single point pick-up attachment/harness that will connect to a rescue hoist cable hook. Hook up shall be accomplished by survivor.
  - (c) Attachment of a fragmentation protective carrier containing a body armor insert for front and back with quick release capability.
  - (d) Attachment for a life preserver.
  - (e) Retention of essential day and night signal and communications components.
  - (f) Pockets for the specific use of essential environmental survival components.
  - (g) Optimum ease of operation and accessibility for a partially disabled aircrewmember.
- (4) All materials used in the construction of the vest shall be resistant to: flame, rust, rot, fungus or corrosion.
- (5) The vest shall be suitable for storage and use in all climate categories as defined in AR 70-38.
- (6) Shelf life of the vest shall be a minimum of five (5) years, desirable of fifteen (15) years.
- (7) Chemical decontamination of the vest shall be accomplished with present fielded decontamination equipment.
- (8) Transportability of this item shall present no unique problems.

(9) The total vest system completely assembled with components, survival armor and flotation must be compatible with all cockpit and crew station geometry, all seats, restraint systems, flight clothing, and other life support equipment.

(10) The vest shall be repairable using standard fabric repair procedures.

(11) All vest retention devices will secure all components during a crash to avoid injuries to the crew member..

(12) The vest design shall minimize body heat retention.

(13) Vest shall contain the following components:

- (a) Survival radio.
- (b) Mirror, emergency signaling (small).
- (c) MK-13 day-night flares (2 ea).
- (d) Compass, magnetic (Lensatic).
- (e) Signal kit foliage penetrating, M185.
- (f) Light, marker distress SDU-5/E.
- (g) Environmental packets (2).
- (h) Survival manual/instruction.

b. Nuclear Hardening and Other Considerations.

(1) Nuclear survivability is not required because the system is not being developed for use in a nuclear conflict.

(2) COMSEC and ECCM are not considerations for the survival vest because of the nature of the item.

c. Non Nuclear Survivability. The survival vest must be designed to withstand use in adverse combat conditions. This could, but may not

be, limited to use in dust, dirt, mud, sunshine and wet environments or any extremes thereof.

d. RAM.

(1) RAM requirements are not applicable to the survival vest.

(2) RAM rationale--provided in annex C.

6. TESTING REQUIRED.

a. Development and Operational Testing (DT II and OT II) will be conducted with all aircrew stations on all aircraft except OV-1.

b. DT II and OT II will be programmed by DARCOM and TRADOC.

c. Milestones.

	<u>QTR</u>	<u>FY</u>
(1) Initiation	2	81
(2) Engineering and HF evaluation	4	81
(3) DT/OT	1	83
(4) DEVA IPR		84

7. LOGISTIC SUPPORT IMPLICATIONS. The vest shall be designed for repair at DS/GS level and shall be maintainable with standard type tools and equipment.

8. TRAINING ASSESSMENT. The materiel developer and TRADOC proponent will develop a complete training subsystem to support the aircrew survival/armor/recovery vest. This training sub-system will include a complete Skill Performance Aids (SPA) package including all training devices and training materials necessary to provide individual and collective training in both institutions and units.

a. The TRADOC proponent will provide the DARCOM developer with information on the target user populations and will assist the materiel developer in identifying any unusual training requirements inherent in the intended user population.

b. The contractor will produce, and DARCOM and TRADOC will arrive at a signed agreement on, a complete list of operator/crew and maintenance tasks through the general support maintenance level. This task list will be generated IAW MIL-M-63035.

c. The materiel developer will procure a complete SPA and training package, to include TM and training materials, for the system. The SPA package will be developed and funded IAW and DARCOM/TRADOC SPA Policy Statement.

d. Requirements for training devices identified in the demonstration and validation phase, and for which no separate requirements document exist, are as follows: None.

e. The need for additional training requirements and materials, such as classroom trainers or collective trainers, which were not identified in the demonstration and validation phase, will be investigated. The necessary TRADOC/DARCOM responsibilities and resources to develop these additional training materials will be established and requirements documents will be prepared as appropriate.

f. The TRADOC proponent will prepare/update the Individual and Collective Training Plan (CTP) which will describe all system training requirements. The ICTP will specify MOS, skill levels, jobs and tasks

to be trained using SPA materials and will also describe the requirements for materiel developer training for service school staff and faculty.

g. The TRADOC proponent will develop training products not included in the SPA package or developed by the materiel developer as the result of a DARCOM/TRADOC agreement. These products include the ARTEP, SQT, Soldiers Manuals, TEC materials, motion pictures.

h. TMs and training materials developed by the materiel developer will be made available to the TRADOC proponent school in sufficient time to allow preparation of the Training Test Support Package for OT II.

i. The draft SPA package, prototype system training devices and TRADOC developed training materials to support OT II will be delivered to the test site IAW AR 700-127 and AR 71-2 and tested as part of the overall system during OT.

j. The ability of OT test player personnel, representative of the user population and trained with the DARCOM/TRADOC training materials, to perform the required tasks to the specified level of proficiency will be a critical issue for test.

k. All elements of the training support package for individual and collective training will be available in final form for system IOC.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. System development will require no increases in logistics, personnel or training support requirements beyond current Army needs.

10. OTHER SERVICE OR ALLIED NATION INTEREST. Representatives from all other US Armed Services participated in the Aviation Life Support

Survival Vest/Kit Conference held in March 1979. The results of the conference generated this requirement document. The draft LR was staffed with the other uniformed services. Indications received reflect a high interest in the development of this item since other services have similar needs and equipment problems.

11. LIFE CYCLE COST ASSESSMENT. To be furnished by NARADCOM.

DRAFT LETTER REQUIREMENT  
FOR  
SURVIVAL ENVIRONMENTAL PACKET

1. TITLE OF ITEM. Survival Environmental Packets.

2. STATEMENT OF NEED.

a. A need exists to provide the aircrewmember operating in the temperate, hot weather, cold weather and over water flight environments with essential climatically orientated survival components for the proposed Survival Armor Recovery Vest; to provide a means of immediate self-aid in the event of an emergency which places them in a survival situation.

b. This item is required by FY 80.

c. CARDS.

3. JUSTIFICATION.

a. Problem. Current survival vest components for use (tropical) are not adequate nor practical in all environmental regions.

b. Operational Deficiency. Temperate, cold, hot and over water environments require specific survival components adopted to weather extremes and other conditions that exist in each environment. The proposed Survival Environmental Packets will provide aircrewmembers with essential climatically oriented survival components for immediate self-aid in either temperate, hot, cold or over water survival environments. Adoption to combination environments will be possible by use of, for instance, both hot and over water packets.

4. BASIS OF ISSUE.

a. Generally, three packets will be issued per aircrewmember, one temperate and two environmental packets.

b. Packets will be issued IAW CTA-50-900.

5. PRINCIPAL CHARACTERISTICS.

a. Performance characteristics.

(1) Each packet shall provide the aircrewmembers with essential signal mini-medical components specifically identified for survival in the environmental region of assignment.

(2) Packets shall be designed to fit in the two pockets provided on the survival armor recovery vest.

(3) Each packet shall be designed for optimum ease of opening and accessibility by a partially disabled aircrewmember.

(4) All survival packets shall be VACUUM packed and sealed.

(5) All materials used shall be rust, rot, fungus, corrosion resistant and flame resistant where feasible, with a shelf life of not less than 5 years.

(6) Chemical decontamination of the packets shall be accomplished with present fielded decontamination equipment.

(7) Transportability of these items shall not present any unique problems.

(8) The temperate/basic weather packet shall provide for:

(a) Signal devices (not already provided in the vest) that are designed for general use in temperate climates.

(b) A medical kit shall be developed to meet the environmental conditions of the temperate zone flight conditions. This kit would be designed for potential survival situations in areas where extreme temperatures are not encountered.

(c) As a minimum, the temperate packet shall contain:

1. Flash guard (blue).
2. Water bag.
3. Mosquito net.
4. Metal match and tinder.
5. Razor knife.
6. Rescue/signal blanket.
7. Signal mirror (metal).
8. Sun screen.
9. Water purification tablets.
10. 3 x 5 gauze bandage (new).
11. Asprin tablets.
12. Band-aids (larger than present).
13. Bedadine antiseptic.
14. Matches (stick and waterproof).
15. Flexi-saw.
16. Jack knife.
17. Two packets for other medical items as determined by needs.

(9) The cold climate packet shall consist of:

(a) Immediate self-aid essential signal survival items (not already in the vest) that are applicable to cold regions. These additional items

shall assist the aircrewmember in critical communications with search and rescue activities in the Arctic regions.

(b) A medical kit shall be developed to meet the critical and extreme temperature/environmental requirements of cold regions.

(c) Cold climate packet shall contain:

1. Fire starter M-2 (2 ea).
2. Cold climate chapstick.
3. Water/wind proof matches.
4. Non-deterorating heat tablets.
5. High protein foods (new D v).
- 6 Sewing kit (heavy duty).
7. One quart water bag.
8. Packet holder made of bright colored Velcro material.

(10) The hot climate packet shall consist of:

(a) Immediate self aid essential signal survival items (not already in the vest) that are applicable to hot regions. Those additional items shall assist the aircrewmember in critical communications with search and rescue activities in hot environments.

(b) A medical kit shall be developed to meet the critical and extreme temperature/environmental requirements of the hot regions.

(c) As a minimum the hot packet shall contain:

1. Hot climate type chapstick.
2. Solar still.
3. Water/wind proof matches.
4. Water bag.

6. TESTING REQUIRED.

a. Development and Operational Testing (DT/OT II) will be conducted with all aircrew stations on all aircraft.

b. DT/OT II will be programmed by DARCOM and TRADOC.

c. Milestones.

	<u>QTR</u>	<u>FY</u>
(1) Initiation	2	81
(2) Test Review	4.	81
(3) DT/OT	1	83
(4) DEVA. IPR	1	84

7. LOGISTIC SUPPORT IMPLICATIONS.

a. Vac packed components damaged or opened accidentally shall be returned to the depot for inspection and repack.

b. Logistic support in all other cases will be identical to the current system.

8. TRAINING ASSESSMENT. The materiel developer and TRADOC proponent will develop a complete training subsystem to support the survival environment packets. This training subsystem will include a complete Skill Performance Aids (SPA) package including all training devices and training materials necessary to provide individual and collective training in both institutions and units.

a. The TRADOC proponent will provide the DARCOM developer with information on the target user populations and will assist the materiel developer in identifying any unusual training requirements inherent in the intended user population.

(11) The over water packet shall consist of:

(a) Essential self-aid signal devices (not already provided)

that are applicable to the crewmembers' survival in a water environment. The additional items shall assist the crewmember in critical communications with search and rescue activities.

(b) A medical kit shall be developed to meet the critical/extreme survival conditions associated with over water survival and water immersion.

(c) The over water packet shall contain:

1. Dye marker (2 ea).

2. Anti-motion sickness tablets.

3. Whistel.

4. Chapstick.

b. Nuclear Hardening and Other Considerations.

(1) Nuclear survivability is not required because the system is not being developed for use in a nuclear conflict.

(2) COMSEC and ECCM not applicable to these items.

c. Non Nuclear Survivability. The items/packages called for in this document must be designed for use in typical to adverse combat conditions. Considerations should be given for anticipated use of the proposed items in dust, dirt, mud, sun, wet or other extreme environments.

d. RAM. RAM requirements are not applicable to the survival packets. RAM rationale--see rationale annex.

b. The contractor will produce, and DARCOM and TRADOC will arrive at a signed agreement on, a complete list of operator/crew and maintenance tasks through the general support maintenance level. This task list will be generated IAW MIL-M-63035.

c. The materiel developer will procure a complete SPA and training package, to include TM and training materials, for the system. The SPA package will be developed and funded IAW and DARCOM/TRADOC SPA Policy Statement.

d. Requirements for training devices identified in the demonstration and validation phase, and for which no separate requirements document exist, are as follows: None.

e. The need for additional training requirements and materials, such as classroom trainers or collective trainers, which were not identified in the demonstration and validation phase, will be investigated. The necessary TRADOC/DARCOM responsibilities and resources to develop these additional training materials will be established and requirements documents will be prepared as appropriate.

f. The TRADOC proponent will prepare/update the Individual and Collective Training Plan (CTP) which will describe all system training requirements. The ICTP will specify MOS, skill levels, jobs and tasks to be trained using SPA materials and will also describe the requirements for materiel developer training for service school staff and faculty.

g. The TRADOC proponent will develop training products not included in the SPA package or developed by the materiel developer as the result of a DARCOM/TRADOC agreement. These products include the ARTEP, SQT, Soldiers Manuals, TEC materials, motion pictures.

h. TMs and training materials developed by the materiel developer will be made available to the TRADOC proponent school in sufficient time to allow preparation of the Training Test Support Package for OT II.

i. The draft SPA package, prototype system training devices and TRADOC developed training materials to support OT II will be delivered to the test site IAW AR 700-127 and AR 71-2 and tested as part of the overall system during OT.

j. The ability of OT test player personnel, representative of the user population and trained with the DARCOM/TRADOC training materials, to perform the required tasks to the specified level of proficiency will be a critical issue for test.

k. All elements of the training support package for individual and collective training will be available in final form for system IOC.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. The development of this system will not increase logistics, personnel or training support beyond current needs. Use of special packaging such as VAC sealing will reduce inspection time over present system and could eventually reduce manpower requirements.

10. OTHER SERVICES OR ALLIED NATION INTEREST. The proposed system may be applicable to all services and allied nations, USAF, USMC, USN and

USCG are aware of this development effort and have expressed an interest in the development of this system.

11. LIFE CYCLE COST ASSESSMENT. To be provided by NARADCOM.

DRAFT LETTER REQUIREMENT  
FOR  
AN AIRCRAFT MODULAR SURVIVAL SYSTEM

1. TITLE OF THE ITEM. Aircraft Modular Survival System.

2. STATEMENT OF NEED.

a. Aircrews and passengers operating in all environments (temperate, hot, cold and over water) need a system that will provide a means for their survival in the event of an emergency which places them in a survival situation. The system must interface with available storage space on current and developmental airframes, complement existing and developmental clothing for environmental protection and provide necessary equipment with which personnel may accomplish tasks critical to their survival.

b. This system required by 1980.

c. CARDS reference Number:

3. JUSTIFICATION.

a. Problem. Survival kits currently in use are unsuitable for their intended purpose. Additionally, none are designed for passenger use.

b. Operational Deficiency. Current Army survival kits for aircrewmembers were adopted on a piecemeal basis. As a result, they fail to functionally interface in varying degrees with current and developmental airframes, projected survival scenarios, clothing and

protective equipment. Current kits do not provide sufficient environmental protection or items of equipment with which personnel may accomplish tasks critical to survival in all environments of the world. Design of current kits for individual rather than crew use results in excessive weight and bulk due to excessive duplication of component items. Use of the modular concept in a system designed to interface with airframes, projected survival scenarios, clothing and protective equipment together with use of improved technology, such as vacuum packaging, will eliminate existing deficiencies and provide functional, lightweight, small bulk kits necessary for survival in all regions.

4. BASIS OF ISSUE. The basic modules will be issued to crews operating in Climatic Zones I thru VII of CTA 50-900. See table 1 below.

TYPE OF MODULES TO BE ISSUED PER CLIMATE CONDITION

CLIMATE CONDITION	BASIC MODULE	OVER WATER	HOT	COLD
1	X	X	X	
2	X	X	X	
3	X	X	X	
4	X	X		
5	X	X		
6	X	X		X
7	X	X		X
8	X	X		X

Table 1

Table 2 provides a breakdown of numbers and sizes of modules for various crew combinations.

BASIS OF ISSUE PER TYPE AIRCRAFT

AIRCRAFT	NUMBER OF MODULES & SIZE		CREW/PAX TOTALS
UH-1	2-2 Man	2-5 Man	10
AH-1/AAH-64	1-2 Man		2
OH-58	2-2 Man		4
CH-47	1-2 Man	6-5 Man	32
CH-54	2-2 Man		3
UH-60	2-2 Man	2-5 Man	14
OH-6	2-2 Man		4
C-12	2-2 Man	1-5 Man	
U-8	1-2 Man	1-5 Man	6
U-21	1-2 Man	1-5 Man	9
T-42	2-2 Man		4

Table 2

5. PRINCIPAL CHARACTERISTICS.

a. Description. The modular survival system will consist of environmental or climatic specific modules containing items of equipment necessary for aircrew survival which are either intended for group use or are too heavy or bulky to be components of the Aircrew Survival/Armor Recovery Vest. The system shall complement and interface with

the Aircrew Survival/Armor Recovery Vest and its environmental packets. The modular system will be configured with basic or temperate climatic units which can be quickly and easily modified for specific climates or environments by the addition or deletion of hot, cold or over water environment specific modules. Combination environments such as cold-over water or hot-over water will be accommodated as necessary through the use of multiple modules.

b. Performance Characteristics. The aircrew modular survival system:

(1) Must interface with current and developmental airframes for inflight storage on all Army aircraft and be configured at minimum weight and volume to minimize degradation of allowable cargo load.

(2) Must be configured and stowed to minimize damage and remain easily accessible to crewmembers. This includes, but is not limited to, protection from fire, crash impact and provisions for flotation in event of ditching.

(3) Must interface with protective clothing and environmental equipment, oxygen, survival vest and personnel restraint systems to minimize degradation of crew efficiency during inflight operations.

(4) Must complement aircrew clothing and equipment for environmental protection and support and search and rescue interface.

(5) Must interface with existing and developmental over water survival equipment. Over water equipment may be either integral or add on components, i.e., anti-exposure suits, life vest and rafts.

(6) Must be configured in four modules; temperate, hot, cold, and over water. The modules will complement the vest and serve as a means of carrying the heavier or remaining bulky items for personnel use in completing critical survival tasks. Modules will be configured on the basis of both two and five member groups.

(7) Must be suitable for use in terrain and climatic conditions found in zones I thru IV, CTA-50-900 and climatic categories I thru ~~VII~~<sup>IV</sup>, AR 70-38.

(8) Must contain sufficient quantities of consumable components (except food and water) to last 24 hours.

(9) Must be configured with devices to discourage pilferage of contents.

(10) Must consider existing and developmental survival equipment within the DoD inventory and civilian market.

(11) Must contain component items which provide the crew or crewmember with capabilities critical to their survival as follows:

(a) Basic or temperate module shall contain:

1. Medical supplies, with directions, to provide aid for individuals with injuries sustained during survival crash sequences.

2. Tools per individual, which will cut or otherwise remove materials such as restraint harnesses, wire bundles, plexiglass and skin of the aircraft.

3. Suitable survival literature to include a copy of AFM-64-5 per module and an individual pocket size aircrewmember survival guide shall be provided.

4. Tool(s) for constructing shelters of natural materials such as snow, ice, earth, and vegetation shall be provided in appropriate modules.

5. Tool(s) and material(s) for building and sustaining a fire during periods of heavy precipitation utilizing natural materials as fuel.

6. A provision for utilizing aircraft fuel for heat.

7. Must include multiple means of visual signaling with capabilities as follows: Required, equivalent to current components of kits listed in paragraph 7; Desirable; visible at 10NM daytime and 5NM nighttime for altitude to 10,000 ft AGL.

8. Must include tools and materials to utilize natural materials for signaling.

9. Survival rations sufficient to sustain the crew for 24 hours except the cold module which shall contain provisions for 72 hours contingent upon available space.

10. Tool(s) and materials to obtain natural food from the environment.

11. Tools and materials to obtain water from the environment. This will include but not limited to, a means to melt snow or ice, purify water and then store the water in the following quantity: Minimum 1 gallon; desirable 3 gallons.

12. The following items will be contained in each respective 2-5 man temperate/basic module:

<u>COMPONENT</u>	<u>2 MAN MODULE</u>	<u>5 MAN MODULE</u>
Survival manual	1	1
First aid kit	1	2
Wire snare	1	1
Signal smoke & illumination MK-13	2	4
Matches, non safety wood	1	1
Box match, water proof	1	1
Fishing kit	1	1
Food packets, survival	2	10
Head net, insect	2	5
Spoon, plastic	2	5
Fuel, compressed (ration heating)	1	5
Pan, frying	1	2
Back-up batteries, radio	1	1
Light, marker	1	1
Fire starter, lighter butane	1	2
Bag, storage	1	3
Net gill, fishing	1	1
Insect, repellent	1	2
Solar still	1	2
Sun glasses	2	5

(b) Cold climate module shall contain:

1. Water protected from freezing for one hour at  $-50^{\circ}\text{F}$  in the following quantity: Required, one pint per individual; desired, one quart per individual.

2. The cold climate aircraft module shall contain one sleeping bag issued on the basis of one per individual.

3. The cold module shall contain a shelter capable of withstanding winds to 40 kts, easily and quickly erectable on ice pack or bare, frozen ground by one individual. The shelter must be configured to be both vapor permeable and waterproof and must include provisions for insect protection and ventilation for year around use. The shelters must be compatible with both two and five member crews.

4. A means for one individual to travel over snow (cold module only).

5. Tool(s) and materials with which over snow equipment can be constructed using natural materials.

6. Must contain sufficient quantities of consumables to last at least 14 days (except food and water).

7. The following items will be contained in each respective 2 and 5 man cold climate module:

<u>COMPONENT</u>	<u>2 MAN MODULE</u>	<u>5 MAN MODULE</u>
Sleeping bag	2	5
Food packets, survival	4	10
Candle, illuminating type I	6	12
Stove, gasoline burner M1950	1	1
2 Man mountain tent	1	
5 Man mountain tent		1
Saw knife, shovel	1	1
Snow shoes, trail type, magnesium frame and bindings, one set per aircraft except OV-1.		

Distress signal, day/night MK-13	4ea
Whistle	1ea
Desalter kit	5ea
Solar distillation, Class B	1ea
Adapter, distillation bag	1ea
Food packets, survival gen purpose	5ea
Water, storage bags, size A	5ea
Survival manual	1ea
Bailing sponge, size 8, type II	2ea
Bailing bucket	1ea
Sunburn ointment	2ea
Light, distress marker	1ea
Canopy	1ea
Canopy rods	6ea
Canopy mast	1ea
Equalizer clamps	2ea
Dye marker	4ea
Nylon Cord (30 ft)	1ea
Compass, lensatic	1ea

(12) Chemical decontamination of the modular survival system shall be accomplished with present fielded equipment.

(13) Transportability of the modular system shall present no unique problems.

(c) Hot climate module shall contain:

<u>COMPONENT</u>	<u>2 MAN MODULE</u>	<u>5 MAN MODULE</u>
Hat, reversible, sun	2	5
Water, drinking	8	20
Solar still	1	2
Machete	1	1

(d) The over water module shall contain the following:

<u>COMPONENT</u>	<u>2 MAN MODULE</u>	<u>5 MAN MODULE</u>
Bail boat	1	
Sponge	1	
Sea marker	1	
Desalter kit	2	
Sunburn preventive	1	
Solar still	1	
Water, canned	2	10
Life raft*(1 man)		** (6 man, 1)

\*1 man raft will be strapped to individuals' leg or thigh.

\*\*6 man raft has the following accessories contained within its container kit:

Hand pump	1ea
Adapter pump	1ea
Repair kit (10 plugs)	1ea
Radio set	1ea
First aid kits	2ea
Signal mirror, Mark III	1ea

c. Nuclear Hardening and Other Considerations.

(1) Nuclear survivability is not required because the system is not being developed for use in a nuclear conflict.

(2) COMSEC and ECCM are not considerations for this modular system due to the nature of the items contained within it.

d. Non Nuclear Survivability. The aircraft modular survival system must be designed to withstand use in adverse combat conditions. The system must function in extreme operations such as dust, dirt, wet, muddy, snow or any other environmental conditions that survivors of downed aircraft may encounter.

e. RAM. Quantitative RAM requirements are considered to be not applicable to the proposed system since the system is considered passive from a RAM standpoint. The proposed system will be comprised of current standard/or soon to be standard items and is therefore, essentially nondevelopmental in nature.

6. TESTING REQUIRED.

a. DT-OT testing is required to ensure compliance with stated criteria.

b. Milestones: to be supplied by the materiel developer.

7. LOGISTIC SUPPORT IMPLICATIONS.

a. The proposed system will replace the following survival kits used in applicable regions (SB 700-20, Mar 79).

<u>LIN</u>	<u>NSN</u>	<u>NOMENCLATURE</u>	<u>PRICE</u>
(1) U72412	1680-00-973-1862	Survival kit, Individual, cold climate	\$363.00
(2) U72686	1680-00-973-1863	Survival kit, Individual, over water	\$337.00
(3) U72549	1680-00-973-1861	Survival kit, Individual, Hot	\$326.00

b. Logistics support methods will be identical to the replaced items. However, the totality of logistic support will be greatly reduced due to elimination of items listed in paragraph 7a above.

8. TRAINING ASSESSMENT. The materiel developer and TRADOC proponent will develop a complete training subsystem to support the aircraft modular survival system. This training subsystem will include a complete Skill Performance Aids (SPA) package including all training devices and training materials necessary to provide individual and collective training in both institutions and units.

a. The TRADOC proponent will provide the DARCOM developer with information on the target user populations and will assist the materiel developer in identifying any unusual training requirements inherent in the intended user population.

b. The contractor will produce, and DARCOM and TRADOC will arrive at a signed agreement on, a complete list of operator/crew and maintenance

tasks through the general support maintenance level. This task list will be generated IAW MIL-M-63035.

c. The materiel developer will procure a complete SPA and training package, to include TM and training materials, for the system. The SPA package will be developed and funded IAW and DARCOM/TRADOC SPA Policy Statement.

d. Requirements for training devices identified in the demonstration and validation phase, and for which no separate requirements document exist, are as follows: None.

e. The need for additional training requirements and materials, such as classroom trainers or collective trainers, which were not identified in the demonstration and validation phase, will be investigated. The necessary TRADOC/DARCOM responsibilities and resources to develop these additional training materials will be established and requirements documents will be prepared as appropriate.

f. The TRADOC proponent will prepare/update the Individual and Collective Training Plan (CTP) which will describe all system training requirements. The ICTP will specify MOS, skill levels, jobs and tasks to be trained using SPA materials and will also describe the requirements for materiel developer training for service school staff and faculty.

g. The TRADOC proponent will develop training products not included in the SPA package or developed by the materiel developer as the result of a DARCOM/TRADOC agreement. These products include the ARTEP, SQT, Soldiers Manuals, TEC materials, motion pictures.

h. TMs and training materials developed by the materiel developer will be made available to the TRADOC proponent school in sufficient time to allow preparation of the Training Test Support Package for OT II.

i. The draft SPA package, prototype system training devices and TRADOC developed training materials to support OT II will be delivered to the test site IAW AR 700-127 and AR 71-2 and tested as part of the overall system during OT.

j. The ability of OT test player personnel, representative of the user population and trained with the DARCOM/TRADOC training materials, to perform the required tasks to the specified level of proficiency will be a critical issue for test.

k. All elements of the training support package for individual and collective training will be available in final form for system IOC.

9. MANPOWER/FORCE STRUCTURE ASSESSMENT. System development will require no increases in logistics, personnel or training support requirements beyond current Army needs.

10. OTHER SERVICES OR ALLIED NATION INTEREST. The proposed system may be applicable to all Services and Allied Nations. USMC, USN, USAF, and USCG were made aware of the proposed system at Tri-Service Conference held at NARADCOM 20 and 21 March 1979.

11. LIFE CYCLE COST ASSESSMENT. To be provided by NARADCOM.

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