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SUSTAINED/CONTINUOUS OPERATIONS SUBGROUP OF THE DEPARTMENT OF DEFENSE HUMAN FACTORS ENGINEERING TECHNICAL GROUP

PROGRAM SUMMARY AND ABSTRACTS FROM THE 8TH SEMIANNUAL MEETING

Compiled by D.L. Reeves and R.E. Gadolin

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Naval Aerospace Medical Research Laboratory
Naval Air Station
Pensacola, Florida 32508-5700

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Reviewed and approved 18 April 1989

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SUMMARY PAGE

OVERVIEW

This document is a synopsis of the proceedings of the 8th meeting of the Department of Defense Human Factors Engineering Sustained/Continuous Operations Technical Subgroup (DOD HFE SUSOPS/CONOPS Sub-TG). The Subgroup is commonly referred to as the SUSOPS Sub-TG. The 1 November 1988 meeting was held in conjunction with the 21st meeting of the Department of Defense Human Factors Engineering Technical Group (DOD HFE TG) in Albuquerque, New Mexico. The meeting was conducted as a symposium in which six presenters reviewed their research test and evaluation methodologies and technologies as they applied to the topic of sustained and continuous operations in the military. A broad spectrum of topics was covered that ranged from issues concerned with computer modeling and expert systems for guiding military SUSOPS to development of dietary countermeasures for sustained diving operations.

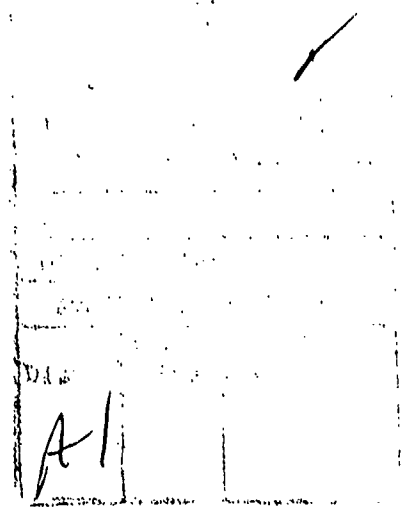
APPROACH

The SUSOPS Sub-TG meets semi-annually to provide a mechanism for working-level exchange of technical information and to enhance coordination of research among research laboratories. Membership consists of technical representatives from agencies with research and development responsibility in specified (e.g., SUSOPS) topical areas.

The purpose of this document is to support the TG charter of technical exchange and communication of current SUSOPS-related research and results. Interested readers are encouraged to contact the presentation authors directly if further topical information is desired.

Acknowledgments

The DOD HFE SUSOPS/CONOPS Sub-TG would like to extend special thanks to the Naval Medical Research and Development Command and the Naval Aerospace Medical Research Laboratory for providing support and a mechanism for publications such as this one.



INTRODUCTION

The Department of Defense (DOD) Human Factors Engineering Sustained/Continuous Operations Technical Subgroup (DOD HFE SUSOPS/CONOPS Sub-TG) is one of 13 such groups that constitute the foundation of the DOD Human Factors Engineering Technical Group (DOD HFE TG). The DOD HFE TG is sponsored by the Office of the Undersecretary of Defense Research and Engineering (OUSDR&E). Its mission is to provide a mechanism for exchange of technical human factors engineering information and to enhance working-level coordination among Government agencies.

The Sub-TGs provide a forum for detailed exchange of information and coordination in specified topical areas (e.g., human factors test and evaluation, standardization, workload, aviation screening, performance measurement, user-computer interaction, etc.). The DOD HFE TG meets for 3 days semiannually: in spring and fall. The Sub-TGs must meet with the DOD HFE TG (commonly referred to as the "mother TG") once per year but may also have additional meetings elsewhere with local sponsorship arrangements. The minutes from these meetings are reported during plenary sessions held by the mother TG.

The DOD HFE TG membership consists of technical representatives from government agencies with R&D responsibility in human factors engineering topical areas. Department of Defense employees are permitted to attend the full 3-day meeting of the DOD HFE TG. Non-DOD personnel may participate in the Sub-TGs but are not permitted to attend at the full DOD HFE TG meetings unless specifically invited as a technical or industrial societal representative or to make a presentation to the mother TG.

The SUSOPS/CONOPS Sub-TG was designed and created to:

- . provide a mechanism for the exchange of technical information.
- . enhance mid-management and working level coordination among government agencies involved in RDT&E of sustained/continuous operations.
- . identify human factors technology gaps and requirements that are relevant to sustained/continuous operation.
- . encourage and sponsor indepth technical interaction.
- . assist, as required, in the preparation and coordination of tri-service documents.

The Sustained/Continuous Operations Sub-TG held its 8th formal meeting at the Albuquerque Hilton on 1 November 1988 in conjunction with the 21st meeting of the DOD HFE TG.

The speakers and titles are listed in the agenda presented in Section A. Section B is an abstracted summary of their presentation including one by Dr. Warren (Presentation 7), which was delivered during the plenary session of the mother TG. A partial attendance listing for the meeting is in Section C. No formal business for the Subgroup was addressed during the meeting with one exception. This was an announcement to hold the 9th Subgroup meeting, off-

line. in Washington, DC, just prior to the Aerospace Medical Association convention.

The SUSOPS/CONOPS Sub-TG charter is presented in Section D. Those interested in attending the Sub-TG meeting and receiving future SUSOPS publications are requested to complete the address form (Section E) and mail it to the address indicated. The latter will allow the Sub-TG committee to add your name to our current mailing list and efficiently distribute announcements and future publications directly to you.

SYNOPSIS OF PRESENTATIONS

The meeting opened with a talk by LT Krueger from the Army Aeromedical Research Laboratory in Ft. Rucker, Alabama. He provided a summary of a briefing that he delivered to the Armed Services Biomedical Research Evaluation Management (ASBREM) Committee earlier this year. This briefing was an overview of SUSOPS/CONOPS research currently being conducted by the U.S. military.

The next presentation was by Dr. Vandivier from TRADOC Analysis Command. His talk concerned methodology in predicting soldier performance using human factor information. Their program has involved a literature review, development of a human factor scale, data collection, and evaluation of the data using factor analysis and multiple regression tables.

Ms. Van Nostrand from the U.S. Army Concepts Analysis Agency in Bethesda, Maryland, was the third speaker. She emphasized the need to include research from studies with human subjects in the development of combat models instead of the ideal "robot" soldiers.

Dr. Carl Englund from the Naval Health Research Center in San Diego followed with a review of sustained operations research at that institution. The main emphasis there has been on the study of Marine Corps sustained operations. They are concentrating on three areas: behavior, pharmacology, and diet.

The fifth speaker was Dr. Doubt of the Naval Medical Research Institute in Bethesda, Maryland. He delivered an excellent discussion on selected aspects of sustained operations and diving. The thrust here is on prolonged shallow water hypothermic conditions used by special operations personnel, with the main emphasis being on thermal stress and the development of protective equipment.

The final talk was by Dr. Sam Schiflett of the Air Force School of Aerospace Medicine in San Antonio, Texas. He presented an overview of the Air Forces' new SUSOPS facility, which they call Aircrew Evaluation Sustained Operations Performance (AESOP). Their current work involves aircraft simulators (E-3 AWACS aircraft) and evaluations of the performance decrement observed in command control personnel. They are able to simulate a variety of inflight emergency situations and use a variety of tests, including a complex cognitive assessment battery, for each crew station.

The Sub-TG also sponsored a presentation by Dr. Warren (Presentation 7) of the U.S. Army Natick RD&E Center in Natick, Massachusetts, during the plenary session of the mother TG. His summary of the Load Expert System (LES) for decision support for the soldier provided a fascinating demonstration of a computer-generated expert system that holds promise as a mission-planning aid for field commanders.

SECTION A

SUSTAINED/CONTINUOUS OPERATIONS SUBGROUP OF THE DOD HFE TG
Nevada Room, Albuquerque Hilton, Albuquerque, New Mexico

AGENDA

1 November 1988

- 1330-1415 LTC Gerald P. Krueger
U.S. Army Aeromedical Research Laboratory
- . An overview of DOD SUSOPS/CONOPS sponsored programs:
The ASBREM report
- 1415-1435 Dr. Phillip Vandivier
TRADOC Analysis Command
- . Methodology which predict soldier performance from human
factor information
- 1435-1500 Ms. Sally J. Van Nostrand
U.S. Army Concepts Analysis Agency
- . Including the soldier in combat models: Current Issues
- 1500-1515 Break
- 1515-1535 Dr. Carl E. Englund
Naval Health Research Center
- . A review of SUSOPS research at NHRC
- 1535-1600 Dr. Thomas J. Doubt
Naval Medical Research Institute
- . Diving and Susops
- 1600-1625 Dr. Sam Schiflett
USAF School of Medicine
- . AESOP: Aircrew evaluation sustained operations
performance: An overview of sustained operations

INVITED ADDRESS DELIVERED AT PLENARY SESSION

02 November 1988

- 1330-1400 Dr. Rusty H. Warren
U.S. Army Natick Research, Development, and Evaluation Center
- . LES (Load Exp System): Decision support for the soldier

SECTION B

- Presentation 1: LTC Gerald P. Krueger
U.S. Army Aeromedical Research Laboratory
- Presentation 2: Dr. Phillip Vandivier
TRADOC Analysis Command
- Presentation 3: Ms. Sally J. Van Nostrand
U.S. Army Concepts Analysis Agency
- Presentation 4: Dr. Carl E. Englund
Naval Health Research Center
- Presentation 5: Dr. Thomas J. Doubt
Naval Medical Research Institute
- Presentation 6: Dr. Sam Schiflett
USAF School of Medicine
- Presentation 7: Dr. Rusty H. Warren
U.S. Army Natick Research, Development, and
Evaluation Center

PRESENTATION 1

AN OVERVIEW OF DOD SUSOPS/CONOPS SPONSORED PROGRAMS: THE ASBREM REPORT - 1988

Gerald P. Krueger, LTC, USA
U.S. Army Aeromedical Research Laboratory
Fort Rucker, AL 36362-5292
(205) 255-6866 or AV 558-6866/6862

OBJECTIVES

Present to SUSOPS/CONOPS Subgroup an abbreviated version of the tri-service research program review briefing given to the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee in July 1988.

APPROACH

Present a programmatic overview of SUSOPS/CONOPS work 1) recently accomplished, 2) presently being conducted, 3) planned for the near future (FY -90), and 4) highlight cooperative, collaborative research efforts among the three services (Army, Navy, and Air Force), pointing out the close intra-service coordination in a self-managed, integrated program. Programs presented were those of DOD medical research laboratories only.

Research programs were presented from the following laboratories: the Naval Health Research Center, Naval Aerospace Medical Research Laboratory, Naval Biodynamics Laboratory, Walter Reed Army Institute of Research, U.S. Army Aeromedical Research Laboratory, and the U.S. Air Force School of Aerospace Medicine.

In part, programs of the Naval Medical Research Institute (NMRI) and the Uniformed Services University of the Health Sciences (USUHS) were also briefed. This overview did not cover the work of our closely coordinated NATO allies such as DCIEM (Canada) and APRE (United Kingdom).

RESULTS AND FUTURE OBJECTIVES

Three research thrusts are apparent:

1. Continued definition of SUSOPS-related problems and identification of groups of soldiers, sailors, and airmen who are most likely and most susceptible to experience sustained intense workloads and the stresses of sleep loss and fatigue during SUSOPS/CONOPS.

2. A dramatically stepped up tri-service program to explore and evaluate efficacy, utility, and safety of pharmacological intervention in SUSOPS/CONOPS. That is, research directed toward select applications for use of hypnotics to stabilize sleep schedules; and stimulants for cases where ensuring a last burst of alertness may be essential to safely complete a mission.

3. A continued basic and applied program to elucidate the neurobehavioral bases for fatigue and the recuperative processes of sleep. Special applications of nap scheduling, sleep hygiene, sleep discipline planning, and sleep logistics are the foci.

Presentation 2

A METHODOLOGY THAT PREDICTS SOLDIER PERFORMANCE FROM HUMAN FACTOR INFORMATION

Dr. Phillip L. Vandivier
TRADOC Analysis Command
Fort Benjamin Harrison, IN 46216
(317) 543-6882 or AV 699-6882

OBJECTIVES

To provide a brief overview regarding a comprehensive research project that will result in an equation that predicts performance from human factor inputs.

APPROACH

The steps that will be implemented to predict soldier performance from human factor information are as follows:

1. Review previous research.
2. Develop human factor and soldier performance scales (if needed).
3. Collect human factor and soldier performance data together during simulated combat.
4. Analyze data using factor analysis.
5. Analyze data using multiple regression. (Attempt to predict soldier performance from human factor scores.)
6. Formulate regression equation that adjusts soldier performance scores in view of different human factor inputs.

RESULTS AND FUTURE OBJECTIVES

Working on AR 5-5 study entitled "Soldier Dimensions in Combat Models," which will provide an action plan for the identification of a technique for inputting soldier "human factor" information into combat models so that outputs can be realistically adjusted in view of adverse conditions.

PRESENTATION 3

INCLUDING THE SOLDIER IN COMBAT MODELS: CURRENT ISSUES

Ms. Sally J. Van Nostrand
U.S. Army Concepts Analysis Agency
8120 Woodmont Avenue
Bethesda, MD 208140-02797
(301) 295-1642 or AV 295-1642

OBJECTIVES

Since 1985, the objective of my projects has been to improve the realism of our computerized combat models by including the factors that represent soldier (and air and seamen, where appropriate) performance. Most combat models are "firepower" models rather than actual combat models. By firepower models, I mean that they rather faithfully represent the equipment aspects of weapon systems but tend to ignore the soldiers' capabilities. The result is that factors such as accuracy of target acquisition, rate of fire, movement rates, and lengths of battles tend to be much overstated. The models usually assume that the soldiers are perfectly trained and, therefore, are able to operate the equipment exactly as the designer intended. Also, they have no fear, never take time for any type of personal maintenance, and never tire.

APPROACH

The approach I have taken is to study combat (by reading historical materials and interviewing soldiers with combat experience) to identify factors that fighters believe are important. At the same time, I have collected research findings on human performance to identify factors that may have relevance to combat performance, including looking for factors that fighters may not have identified. Since the U.S. Army Concepts Analysis Agency (CAA) is a study agency, rather than a research organization, I have attempted to use others' results rather than perform original research. It's sometimes been a problem to make the giant leap from research results to developing personnel performance algorithms (pergorithms). Recently, from necessity, I have started two research projects. One is an attempt to find out how much soldiers will sleep via questionnaires to soldiers, most of whom had combat experience in Vietnam. The other is the development of a multi-disciplinary, multi-agency team which will measure sleep, stress, and performance on military tasks while firefighting.

RESULTS AND FUTURE OBJECTIVES

The "How Much Do Soldiers Sleep?" project shows that officers tend to believe that they will have a sleep plan that allows the enlisted soldiers to sleep enough or nearly enough. However, I believe that there is a problem with the officers themselves. Many seem to think that they are so indispensable, particularly as a company commander, that they will frequently go without sleep for several days, then catch up with one long sleep and start going without again. No results are available for the firefighting project, but we at CAA are really excited about the prospect of developing data that are directly applicable in our combat models.

Unlike most of your members, I hope to perform less and less of my own research, and instead, use research from other agencies in our studies. One reason for my coming to this meeting is to help you to understand what it is that the operations research community needs so that it will be a manageable step from research to studies, rather than a giant leap.

PRESENTATION 4

A REVIEW OF SUSOPS RESEARCH AT NHRC

Dr. C.E. Englund
Naval Health Research Center
P.O. Box 85122
San Diego, CA 92138
(619) 553-8443

PROGRAM 1. *Naval Forces Cognitive and Physical Performance Enhancement During Sustained Operations.*

Objectives

To develop methods for maintenance, enhancement, and/or extension of human performance by the application of medical, physiological, and psychological preventative and/or intervention strategies.

Approach

Lab and field studies, as well as field-validation exercises, are conducted to quantify the extent of performance effects and test efficacy of selected counter degradation methodologies.

Results and Future Objectives

Five studies are underway: 1) performance during SUSOPS and extended "General Quarters," 2) low-carbohydrate/high-fat diets as endurance extender, 3) assessment of failure in allocation of attention during extended multi-task cognitive loads, 4) use of tailored sleep strategies and logistic doctrines, and 5) methods to alter endocrine responses associated with shift work and jet lag performance degradation.

Continue current studies and begin studies of pharmacological strategies for performance enhancement in extreme environments with travel across numerous time zones.

PROGRAM 2. *The Impact of Chemical Defense Measures on Sustained Military Operations.*

Objectives

To describe the effects of sleep loss, heavy workload, chemical-defense clothing, and chemical-defense antidote and pretreatment drugs on performance during SUSOPS as measured by the UTC Tri-service PAMs.

Approach

Conduct laboratory studies of continuous work operations in MOPP IV with increasing lengths of time, sleep loss, and thermal load.

Results and Future Objectives

A series of technical reports has been published that cover studies in three of this five-phase research program.

To continue to develop, refine, and validate the methods and technologies of the PAM, in particular for field studies, and collect performance data using PAM technologies for establishment of standardization and norm development. To develop Micro SAINT models depicting the relationship of performance and physiological responses in field environments, as measured by the PAMs, and correlate these data to operational tasks and performance.

PROGRAM 3. Cold-related Combat Decrements.

Objectives

To identify cold-related combat task performance degradations during arctic SUSOPS and develop a predictive model of performance in cold environments.

Approach

Perform field studies in cold environments with Marine Corps combat personnel during training exercises to collect data for statistical model development.

Results and Future Objectives

New program. First studies underway.

Perform testing of the U.S. Marine and the Norwegian combat troops in joint military exercises and validate model.

PROGRAM 4. The Effects of Continuous Work While Wearing the NB Mark II Helmet with the SBF Mark I Shield.

Objectives

To determine the physical and cognitive performance costs associated with wearing the new shipboard helmet for sustained periods.

Approach

Perform lab and field tests during simulated and real military SUSOPS to determine if the combination of helmet and face shield causes fatigue, spinal, muscular, and cognitive decrements.

Results and Future Objectives

First lab tests indicate spinal compression increases of no lasting consequences. Additional data are being analyzed. Technical reports in process.

Perform field operations tests with Assault Craft Unit personnel during SUSOPS exercises.

PROGRAM 5. *Biomedical Enhancement of Mission Performance of Special Forces Personnel.*

Objectives

Analyze SPECWAR missions determining physiological, physical, and psychological profiles of SPECWAR personnel. Determine performance enhancement methods and develop serum markers for connective tissue changes during training.

Approach

Perform lab simulations and field studies to determine physical requirements, and sleep loss, coldwater, and circadian costs to performance. Prepare and test intervention techniques.

Results and Future Objectives

New program, technical reports in progress.

Test new methods of performance enhancement.

PROGRAM 6. *Human Performance Effectiveness and Physiological Adaption during Sustained Operations.*

Objectives

To describe behavioral and physiological adaption profiles of marines during simulated reconnaissance missions with heavy workload.

Approach

Perform lab studies of successive 20-h episodes of continuous work with/without various rest segments and/or mission start times.

Results and Future Objectives

Result summaries found in NHRC TR 87-17 and other reports.

Program completed.

PROGRAM 7. *Stress, Fatigue, and Work/Rest Cycles Associated with Repetitive Deep Submersible Operations.*

Objectives

To describe the psychological and physical costs of extended submersible rescue and missions.

Approach

Collect field data in various vehicle types and evolutions including rescue engineering tests, diving, and operational modes.

Results and Future Objectives

A series of technical reports has been published.

Program completed.

PROGRAM 8. Sleep Patterns and Performance in Operational Environments.

Objectives

Define the relationship between sleep patterns, performance, and health behaviors of personnel engaged in different types of duties to improve medical and operational guidelines for fitness and readiness.

Approach

Perform a series of lab studies with 44-60 h of sleep loss with rest segments manipulated for time of day.

Results and Future Objectives

Technical reports and final reports have been published.

Program completed.

PROGRAM 9. The Effects of Physiological Cycles on Health and Performance.

Objectives

Describe circadian characteristics of EEG, sleep, body temperature, blood pressure, and pulse related to extended performance.

Approach

Perform lab studies of psychological and psychomotor performance during altered work schedules with sleep loss.

Results and Future Objectives

Published in final reports and various technical reports.

Program completed.

PROGRAM 10. The Effects of Biorhythms on Health and Performance.

Objectives

Describe physiological and performance-related circadian and ultradian rhythms during extended work segments.

Approach

Perform exploratory studies of intermittent work with sleep loss.

Results and Future Objectives

Published in technical reports.

Program completed.

PRESENTATION 5

DIVING AND SUSOPS

Dr. T. J. Doubt
Navy Medical Research Institute
M/S 38
Bethesda, MD 20814
(202) 295-5912

OBJECTIVES

U.S. Navy diving often requires long-duration diving missions in cold water. Job requirements and constraints, such as decompression time, often dictate exposure time. In addition, factors such as diving equipment, fatigue, dehydration, and hypothermia can limit performance.

APPROACH

Diving research studies at NMRI are focused on the multiple factors that might limit performance and develop the physiological criteria necessary for optimal work capacity. This presentation will discuss several studies of the thermal, exercise, and nutritional aspects of divers working in cold-water environments.

RESULTS AND FUTURE OBJECTIVES

Six-hour dives conducted in 5 °C water with 1.4 clo dry suit garments resulted in a drop in core temperature of only 1.1 °C. However, 22% of the dives were aborted because of finger and toe temperatures dropping below 10 °C. Maintaining extremity temperatures at 18 °C vastly increased exposure time. Immersion diuresis results in dehydration that limits exercise performance. The dehydration and exercise responses were not altered by circadian rhythms. Ingesting fluid during immersion does not offset this effect but can increase metabolic heat production. Carbohydrate loading effectively increases work capacity during 4-h cool water immersions.

Additional studies are planned to look at the effects of a variety of water temperatures, depths, exposure times, and workloads on physical and mental performance. Active regional heating is being explored to increase exposure times; as is improving dry suit insulation properties. Hydration and metabolic strategies to increase work capacity are being studied. Probability factors are being developed to predict the success of a given mission requirement.

PRESENTATION 6

AESOP: AIRCREW EVALUATION SUSTAINED OPERATIONS PERFORMANCE: AN OVERVIEW OF SUSTAINED OPERATIONS

Dr. Sam Schiflett
USAFSAM/VNB
Brooks AFB, Texas
(512) 536-3464 or AV 884-3464

OBJECTIVES

Improve aircrew safety and mission effectiveness in a C3 multiple tasking under sustained operations by assessing team performance.

APPROACH

Team performance measurement methodology review. Develop a simulation facility to develop team construct C3 generic workstation to evaluate AWACS weapons system operations.

RESULTS AND FUTURE OBJECTIVES

FY87: Facility developed.

FY88: Generic workstation fully functional.

FY89: AWACS E-3 mission crews evaluated.

FY90: Antihistamine studies.

Transition team performance methodologies to other C3 airborne and ground-based systems, for example, training command. Issue operational guidance. Next objectives: Establish guideline for sleep aid drugs (temazepam) in C3 operations and develop a fatigue model of performance.

PRESENTATION 7

INVITED ADDRESS TO BE DELIVERED AT PLENARY SESSION

LES (LOAD EXP SYSTEM): DECISION SUPPORT FOR THE SOLDIER

Dr. Philip H. Warren
Natick RD&E Center
Kansas Street
Natick, MA 01760-5020
(508) 651-4381 or AV 256-4381

OBJECTIVES

The modern foot soldier carries too much clothing and equipment with him to the field. Combining an excessive load with adverse terrain and weather conditions degrades the soldier's performance, increases the risk of his being injured, and ultimately jeopardizes the success of his mission. The objectives of this work are 1) to provide commanders in training with a means for learning to make smarter soldier load configuration decisions, and 2) to provide commanders in the field with the technology to assist them in making actual soldier-load decisions.

APPROACH

The approach is to build an expert system (computer program), based on a heat-stress model, to help the commander in the decision-making process. The commander enters information about the mission (distance to travel and available time), environmental conditions (temperature, humidity, wind speed, terrain factors), the load (clothing, equipment, weapons, food, water), and finally the soldier himself (height, weight, days of heat acclimation). Once those mission parameters have been defined, the system computes the likelihood of mission success: Can the soldier reach his destination in the time allotted under the conditions specified without becoming a heat stress casualty? If the mission is not likely to succeed, then the program asks the commander a series of questions designed to redefine selected mission parameters, such as what the soldier will carry with him, so that the mission will be more likely to succeed. This process can be carried out interactively until a successful mission scenario is achieved.

RESULTS AND FUTURE OBJECTIVES

A working prototype of the Load Expert System (LES) has been completed. LES runs under MS-DOS from a floppy disk, although, because of processing time, a hard disk is recommended. A second generation system is being prepared, which makes greater use of rules for guiding the commander in the decision making process.

In FY89, the initial knowledge engineering phase of this project will be completed. The resulting first-generation working version of LES will be provided to potential users, most likely at the U.S. Army Infantry School, for evaluation.

SECTION C

ATTENDANCE LIST FOR DOD SUSOPS TG

ALBUQUERQUE, NM

01 NOV 88

ATTENDANCE LIST FOR DOD SUSOPS TG
01 NOV 88, ALBUQUERQUE, NM

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SECTION D

**Charter
Sustained/Continuous Operations
Subgroup of the DOD HFE TG**

**Charter
Sustained/Continuous Operations
Subgroup of the DOD HFE TG**

GOAL

Provide a mechanism for the exchange of technical information for application of Research, Development, Test, and Evaluation (RDT&E) methods and technologies as they apply to sustained/continuous operations. To provide input to DOD decision makers and doctrine developers on sustained/continuous operations issues.

Enhance middle-management and working level coordination among government agencies involved in RDT&E of sustained/continuous operations to make possible the application of the best methodologies and technologies for study of the topic.

Identify human factors technology gaps and requirements for advancement in the state-of-knowledge relevant to sustained/continuous operations.

Encourage and sponsor in-depth technical interaction on the topical areas of human performance during sustained/continuous work, various work/rest schedules, circadian rhythms, and sleep/rest management in military operations.

Assist, as required, in the preparation and coordination of tri-service documents such as Technology Coordinating Papers and Topical Reviews on Sustained/Continuous Operations.

SCOPE

The scope of activities of this group shall include the exchange of information, the working level coordination, and the identification of requirements for all technical areas that are applicable to improving equipment operator performance and manpower utilization during sustained/continuous military operations.

For the purposes of this working group, the term sustained/continuous operations refers to a work schedule that demands steady work productivity during a course of time that goes beyond a "normal" duty cycle and usually involves the onset of fatigue and/or some sleep deprivation.

SUBGROUP

TOPICAL AREAS

The Subgroup will address a variety of human-factor variables that affect performance in sustained/continuous operations, particularly in the operation of equipment and military systems. The general topics of concern to the Subgroup include, but are not limited to:

1. Work/rest schedules- periods of time: work to rest ratios.
2. Circadian rhythmicity- biological rhythms as they vary with respect to time.

3. Alertness and sleep deprivation- adequate amounts of sleep essential for alertness.

4. Sleep discipline- strategies used to ensure proper rest, for example, taking naps.

5. Fatigue-

a) physiological decreases in performance over time, and

b) psychological state: feelings of tiredness, change in motivation, mood, affect, activation, and decrease in cognitive-mental activities.

6. Pharmacological intervention- use of drugs to enhance or sustain performance.

7. Rapid deployment demands- extended operations, translocation disruptions, for example, jet lag.

8. Sustained performance with unique equipment systems (e.g., electro-optical sighting devices, chemical protective clothing, high performance aircraft).

9. Sustained performance in unique environments (e.g., heat, cold, altitude, space).

SUBGROUP COMPOSITION

The composition of the sustained/continuous operations Subgroup will be consistent with the policies of the DOD HFE TG.

Membership in the Subgroup is open to U.S. Government employees, members of academia, private and industrial research organizations, and other interested parties whose work involves them in topics of sustained/continuous operations. Participation of members of U.S. Allied Military Forces is encouraged, subject to individual approval by the Office of the Undersecretary of Defense for Research and Engineering (OUSDR&E), sponsor of the DOD HFE TG.

Members of the Subgroup are encouraged to participate in all Subgroup meetings and activities. (However, although Subgroup membership per se is rather open, under DOD HFE TG policy, only U.S. Government employees are permitted to participate in the full DOD HFE TG meetings, unless invited for a specific purpose.)

OPERATING BOARD

The Subgroup Operating Board is responsible for the conduct of Subgroup business and the implementation of TG policies. The Board provides continuity and structure necessary for the organization and planning of efforts pursuant to Subgroup goals.

The Subgroup Operating Board shall be composed of two representatives from each participating U.S. military service. These representatives must have technical backgrounds in the areas of sustained/continuous operations. It is intended that the two board members from each service represent a combination of responsibilities for research/development and implementation management of sustained/continuous operations technologies within their respective service.

Subgroup Board members may be selected by service caucus or be nominated by their respective service.

CONDUCT OF BUSINESS

Meetings of the Sustained/Continuous Operations Subgroup will be held semiannually; one meeting must be held in conjunction with a semi-annual DOD HFE TG meeting.

Subgroup Chairship will rotate among represented services biannually, in odd-numbered years beginning in 1985. Chair-select will be determined by the Operating Board caucus.

Additional Subgroup officers required (e.g., treasurer, secretary) will be selected by majority vote.

All charges or requests for services of the Subgroup will be received through the Chair for action by the Subgroup Operating Board.

All responses from the Subgroup will be delivered by the Chair, or his/her designated representative, as defined through majority opinion.

Minutes of meetings will be recorded, reviewed, and transmitted by the Subgroup Chair in accordance with policies of the DOD HFE TG.

The Subgroup Operating Board will receive and place priorities on problems to be addressed by the Subgroup. Where appropriate, working groups will be established for addressing particular problems.

Working groups will be chaired by a member of the Operating Board. Membership of working groups will not be restricted to employees of the government and will be nominated by its Chair for approval by a majority of the Operating Board. Working groups will develop plans on a milestone basis and will provide reports of progress at least annually.

Presenters at meetings are required to submit a copy of their presentation and hardcopies of their visual materials to the Subgroup Chair for inclusion in the meeting minutes.

SECTION E

DIRECTORY/MAILING LIST FOR SUSTAINED/CONTINUOUS OPERATIONS SUBGROUP

1. Please make the following changes to the current Directory/Mailing List.

Name _____
(include rank/Ph.D.)

Mailing Address _____
(include code, title)

(include ZIP)

Telephone _____
(include commercial & autovon)

2. Please add/delete the following names.

Name _____
(include rank/Ph.D.)

Mailing Address _____
(include code, title)

(include ZIP)

Telephone _____
(include commercial & autovon)

Mail to:

Rachel E. Gadolin
Code 00B3
Naval Aerospace Medical Research Laboratory
Naval Air Station
Pensacola, FL 32508-5700

Or telephone (904) 452-3668 x 21, AV 922-3668 x 21